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AUTHOR Wentling, Tim L.; And Others
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ABSTRACT

An evaluation described Tech Prep prototypes as they were implemented in five different Indiana sites and assessed their effectiveness. Evaluation procedures included: (1) collection and analysis of data from students involved in Tech Prep for the first time in 1990-91 and students involved for the second year; (2) analysis of prototype project documentation; (3) on-site observation and interviews; and (4) surveys of local business and industry personnel (72 of 375 responded) and postsecondary educators (78 of 134 responded). Although each was unique in a number of facets, the pilot prototypes at Monroe County Community School Corporation, Metropolitan School District of Wayne Township, Bartholomew Consolidated School Corporation, North Montgomery Community School Corporation, and the School City of Mishawaka had a great deal in common. For the most part, the prototypes were in compliance with state guidelines, incorporated features of the state model, and were working toward development of the levels depicted in the state model. Participation in Tech Prep generally appeared to have a more positive effect on the attitudes of 1990-91 students than on the 1989-90 group. An overwhelming majority of postsecondary educators were aware of, involved with, and supportive of Tech Prep. An overwhelming majority of the business and industry respondents were neither aware of nor involved with the Tech Prep curriculum. Suggestions were made for improving Tech Prep. (A Tech Prep post-graduation tracking system form is appended.) (YLB)

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Evaluation Report

ED339839

Technology Preparation Pilot Test
Year 2, School Year 1990-91

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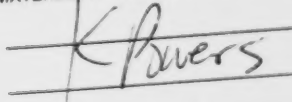
Prepared for:

The Indiana Department of Education

By:

Tim L. Wentling
James A. Leach
James R. Galloway

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Introduction

Tech Prep is a legislatively mandated initiative in Indiana. Its purpose is to help high school age students prepare themselves for entry into technical occupations and/or to continue their education in a post secondary institution. Essentially, the Tech Prep initiative required the curriculum to:

- be performance based;
- provide students with skills necessary to gain employment or to pursue further education upon graduation;
- relate to a broad scope of occupational opportunities;
- include math, science, and English/language arts courses, taught through practical application and designed to meet graduation requirements for those subjects;
- be designed to include secondary and post secondary sequence models; and
- allow for dual credit, advanced study, and cooperative arrangements.

Purpose of the Evaluation

The purpose of this evaluation is to provide a description of prototypes as they are implemented in five different sites and to evaluate the effectiveness of the prototypes and their components. Stipulations included in the legislation (PL-217-87) provided a framework for the development of a number of key questions identified by the Technology Preparation Task Force and Evaluation Consultants.

1. Is the target population being served?
2. Is progress being made toward achieving the program goals?
3. Is the curriculum performance based?
4. Are the science, math, and language arts courses being taught through practical application?
5. Are the student outcomes, in terms of competencies, the same as those for courses taught in the traditional manner?
6. How do local business, industry and labor groups perceive Tech Prep?
7. How do post secondary personnel view Tech Prep?
8. What has been the impact of Tech Prep on school climate?
9. What changes have occurred in students' attendance, attitudes, career maturity, and grade point averages as a result of the program?
10. What features of the prototypes facilitate replication?
11. What are the barriers to implementing Tech Prep?
12. What resources are necessary to implementing the prototypes in other settings?

Objectives Of The Evaluation

- 1. To collect and analyze data about and from students involved in Tech Prep for the first time and students involved for the second year.** These data will be similar to that collected from students in 1989-90. Included will be information related to: achievement, absenteeism, grade point average, gender, career maturity, and attitude toward school and technology. Additionally, data related to the following will be collected: problem solving skills, teamwork skills, and cooperation will be measured. A control group will be used at each site to facilitate analysis of Tech Prep effects.
- 2. To assess each prototype in terms of its match with the Model(s) designed by the Tech Prep Task Force.** The result of this assessment will be communicated in the form of suggestions to each site regarding ways in which their efforts can be better aligned with the proposed Model(s).
- 3. To conduct a survey of business, industry and labor representatives to determine the perceived extent to which the specific Tech Prep curriculum of each prototype will provide required knowledge and skills for productive employment.**
- 4. To conduct a survey of post secondary educators to determine the perceived extent to which the secondary Tech Prep curriculum will provide the knowledge base and skills that are necessary for successful participation in post secondary programs.**
- 5. To establish a mechanism for the tracking of Tech Prep and control group students over the next ten years.** This will facilitate the gaining of feedback and assessing the ultimate effects of Tech Prep on participants.
- 6. To conduct an analysis of required facilities, equipment and materials for each of the courses included in the Tech Prep prototypes.**
- 7. To provide timely reports for the project, as evidenced by the submission of Interim, preliminary and final reports on December 15, 1990, April 16, 1991, and July 31, 1991 respectively.**

Evaluation Procedures

Student Data

Data were collected and analyzed about and from students involved in Tech Prep for the first time in 1990-91 and students involved for the second year. These data were similar to that collected from students in 1989-90. Included was information related to: achievement, absenteeism, grade point average, gender, career maturity, and attitude toward school and technology. Additionally, data related to the following were collected: problem solving skills, teamwork skills, and cooperation. A control group was used in 1989-90 at each site to facilitate analysis of Tech Prep effects.

Assessment of each prototype with the State Model

This objective was accomplished through two major activities. These were: 1) review and analysis of prototype project documentation and 2) on-site observation and interview of students and school personnel.

This activity involved a detailed analysis of prototype plans, course syllabi, student recruitment materials, curriculum materials, equipment lists, and other pertinent information. Evaluation Questions 3, 4, 5, and 10 were addressed by this activity.

On-site visits were made by the evaluation staff for the purpose of gaining first hand feedback regarding the implementation and operation of the prototypes. The on-site visits involved the interview of a cross section of students, program teachers, non-program teachers, administrators, and the Tech Prep Managers. Additionally, evaluation staff reviewed student course materials, and documented the context of the prototypes. This activity addressed evaluation questions 1, 2, 3, 4, 5, 8, 10, 11, 12, 13, and 14.

Survey of local business and industry personnel

This activity involved the polling of a sample of private and public sector employers to gain reaction to the Tech Prep concept and the State Model. A brief mail questionnaire was sent to approximately seventy-five (75) employers in each of the five pilot sites (approximately 375 in all). This activity provided insights into the attitudes held by local employers regarding the perceived appropriateness of the Tech Prep curriculum to the needs of employers. Additionally, it provides an initial awareness effort on the part of each pilot project. This activity addressed evaluation question 6.

Survey of post secondary administrators and instructors

This activity was conducted in order to assess the perceptions and attitudes of post secondary personnel toward the State Model for Tech Prep. This activity focused on a sample of administrators and instructors from institutions to which Tech Prep students in the prototype programs may matriculate. This provided information regarding the perceived appropriateness of the secondary level Tech Prep curriculum for smooth transition and success in the post secondary curriculum. This activity addressed evaluation questions 7, 10, and 11.

Develop a post-graduation tracking mechanism for students

This involved the identification of Tech Prep and control group participants at each site and the development of a set of procedures to be used in tracking these individuals. A sample form has been developed that can be modified as needs for information change. This activity contributed to evaluation questions 2, 6, and 7.

Determine facility, equipment and material needs

This involved the collection of information from Project Managers and instructors at each of the sites. A list of purchased materials was augmented with materials already available or purchased with other funds. This list was rated by the appropriate instructors as to the extent of use and importance of the item to teaching Tech Prep. This activity focused on evaluation question 13.

Results

Results reported in this evaluation report are presented in six sections. First, descriptions of the Tech Prep prototypes as they are implemented in the different sites are presented. Summaries of pretest student data are included in each description.

Second is a summary of student gains that have resulted from Tech Prep activities. Third is a section that presents the summary of the post secondary surveys,. The fourth section includes a summary of the business and industry survey. The fifth section contains conclusions which are drawn across all five sites. Sixth, suggestions are presented which are directed toward the Department of Education and other policy makers concerned about the implementation of Tech Prep.

SECTION I

Description and Analysis of Sites

Monroe County Community School Corporation Bloomington, Indiana

I. Program Description

Setting

Monroe County, located in south central Indiana, has an estimated population of 100,000 people with approximately 53,000 living in the city of Bloomington. The growth rate has shown a slight increase over the past five years. The Bloomington area is experiencing a steady economy with an unemployment rate slightly above 3%. The area's economy is varied with a good manufacturing base and many service related industries.

The employment sector of Monroe County is split into three major categories: industrial/manufacturing, Indiana University, and limestone. Indiana University is the largest employer of the community, accounting for over 6800 jobs. The industrial base of the community is spread across a number of large and small firms including: RCA/Thomson, General Electric, Cook, Inc., Otis Elevator, Westinghouse, Wetterau Foods, B.F. Goodrich, Schlegel Corporation, and others. The limestone business represents world participation in the limestone supply. A number of businesses are involved in quarrying, cutting, and carving limestone for Bybee Stone, C & H Stone, Fluck Stone, B.G. Hoadley Quarries, Independent Limestones, Midland Cut Stone and others.

Monroe County has a varied school population, with segments from blue collar, university related, and management related families. The Corporation has two four year high schools. Bloomington North High School has an enrollment of approximately 1250 students. It is a comprehensive high school with a separate area vocational center serving additional high schools in the area. Bloomington South is the older of the two and is also a comprehensive high school with an enrollment of approximately 1550 students.

Program Goals and Objectives

The Technology Preparation curriculum within the Monroe County Community School Corporation prototype is focused on achieving the following goals:

Goals

- ☐ Technology literacy for all general education students.
- ☐ Increase student motivation and achievement in basic skills areas through applied courses in science, mathematics and language arts.
- ☐ Integrate the curriculum to better reflect the ways that knowledge and information are processed in our modern technological society.

- Increase the number of students attending post secondary technical colleges and universities.
- Increase the number of students ready to enter the world of work through the development of life long learning skills.

Curriculum

The Tech Prep curriculum in Bloomington differs from those implemented in other sites in several ways. First the curriculum begins at the ninth grade. Philosophically, the site personnel have concluded through considerable input from the private sector, that starting in the eleventh grade does not provide sufficient opportunity to build the base that is necessary for dealing with future technology. Further, they believe the general education student is too far along in the eleventh grade to achieve success in a tech prep curriculum to the degree necessary and desirable.

A second difference in the Bloomington Tech Prep curriculum is that it is not being sold as a new and separate program. Rather, it is being portrayed as a strategy for possible inclusion into a redefined and reconstituted curriculum for the entire school(s).

A third difference, though not as extreme a difference as the first two, is the emphasis being placed on teacher staff development in Bloomington. This effort is based upon the belief that a change such as one promoted through Tech Prep requires a great deal of change in teacher attitude and skill. Consequently, changes in teaching and planning for teaching are being facilitated through several innovative staff development activities.

The curriculum for Year 1 and Year 2 is summarized as follows:

Year 1

Physical Science (applied)

Introductory Algebra 1-2 (applied)

Language Arts 1-2 (applied)

(Tech Prep electives include Keyboarding, Computer Applications and Introduction to Business).

Year 2

Biology 1-2

Introduction to Algebra 3-4

Language Arts 3-4

(Tech Prep electives include Computer Applications/Computer Graphics and Introduction to Business).

During the second year of the pilot, a major change occurred through the implementation of Introduction to Algebra 3-4, Biology 1, and Language Arts 3-4. During year 2 the lead teachers developed and implemented the curriculum. Other teachers will use some of the materials, but it will most likely be the third year before across the board implementation is achieved. This is different from selecting one group of students and targeting them for Tech Prep. Instead, it focuses on all, or at least a large portion of those in the general education curriculum. School administrators and the Tech Prep manager believe this a more effective and efficient way to meet the needs of students and to achieve the intent of the Tech Prep law.

Students

As previously stated the MCCSC pilot Tech Prep effort began with the freshman year rather than the junior year. Consequently, the second year's effort deals primarily with 9th and 10th graders. Student selection and recruitment for year two differed considerably from the first year. There was no attempt to single out and recruit particular students. Rather, the effort was focused on curriculum development in particular classes which was expected to "catch" the targeted student population - general education, unfocused enrollees. As Bloomington continues to restructure its general education track it becomes unnecessary to recruit and select particular students since the courses, English, Science, and Math being converted to Tech Prep are typical general education courses. Last year's pilot reached 51 students whereas this year's 1990-91 freshman enrollment is over 300. Sophomore enrollment totals approximately 200.

Faculty

Six teachers were directly involved in the delivery of Tech Prep during the 1989-90 pilot year. Teachers were given the opportunity to work together (e.g., math teacher from North and math teacher from South with another person providing assistance). Also, an intensive staff development activity was provided for all Tech Prep staff during the summer.

The faculty were identified and recruited by the Tech Prep manager working through the assistant principals and department chair persons at each school. Several teachers felt like they were simply "assigned" while most felt they had volunteered and were interested in participating in the program. The faculty, for the most part, are very experienced teachers with an average of 19.6 years of teaching experience.

The Tech Prep teachers are generally enthusiastic about Tech Prep and its potential. Even though all realize its extra demands on their time for planning, preparation, equipment set-up, and meetings, the faculty are committed to the concept and strategies of Tech Prep. A common preparation period is provided for the involved faculty (over and above their regular prep period). This common prep period has paid high dividends at North in terms of facilitating the integration and coordination of content.

Nine faculty are in the process of implementing courses in Biology, Introductory Algebra 3-4, and Language Arts 3-4. Additionally, the English Department has undertaken the task of enhancing the entire Language Arts curriculum, using the concepts and strategies of Tech Prep. Approximately 20 teachers are involved in this task.

II. Compliance with State Guidelines

The following statements describe the extent to which the Bloomington prototype is meeting the State Model Guidelines.

1. Target students in a general, unfocused program of studies

The Bloomington program does target students in a general, unfocused program of study. However, the prototype's current selection process is unique in that it relates to course selection as opposed to student selection. Those courses that are being included in the Tech Prep curriculum at the 9th and 10th grades are typical general education courses. The enrollees in these classes are typically unfocused and unmotivated students. The goal of such efforts is to provide the students with the skills and knowledge necessary to enroll in a post secondary program of study or to more successfully enter the workforce.

2. Involve local business, industry and labor

Local business, industry and labor representatives have been involved in the planning, operation and assessment of Bloomington's Tech Prep efforts. However, the involvement at Bloomington has been less than at the other prototype sites. Involvement has primarily been as members of an advisory committee or providing individual advice. Major contributions involve participation in planning revising, and refining curriculum and assisting in establishing and improving a teacher internship. The business and industry internship program provides teachers with practical experience needed to discover real world applications of the competencies taught in their courses.

3. Develop individual student plans of study

An individual plan of study for each student has not yet been implemented for Tech Prep students enrolled in either Bloomington North or South High Schools. However, several discussions concerning the implementation of a student education plan have ensued this school year.

4. Include articulation agreements between secondary and post secondary institutions

Since the Bloomington prototype has to date involved only 9th and 10th graders, the need for articulation agreements has yet to impact upon the effort. Initial articulation efforts have

been implemented during the second year with secondary and post secondary teachers beginning joint curriculum planning.

5. *Incorporate a staff development process*

Bloomington has conducted extensive professional development activities related to Tech Prep through the office of a District Staff Development Coordinator. Activities have included attendance at state conferences, "Educators in Industry" internships, inservice workshops on learning styles, and different teaching strategies including application based, cooperative learning and coaching techniques.

III. Incorporation of State Model Features

The following statements depict whether or not Monroe County Community School Corporation has incorporated the State's Tech Prep Model features into their Tech Prep efforts.

1. *A secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness taught through practical applications*

Through the efforts of staff, administration, and community representatives, MCCSC has developed a core curriculum of secondary math, science and language arts taught through practical applications.. Although computer applications are extensively used in science and language arts, a specific course in computer applications is an elective course that is strongly recommended. Career awareness activities are included in the core courses. Some economic principles (competencies) are provided in Tech Prep courses.

2. *An articulated secondary-post secondary curriculum*

Articulation agreements with post secondary institutions have not, as yet, been developed. Articulation is limited to beginning efforts among secondary and post secondary instructors at joint curriculum planning.

3. *Multiple entry points*

When completely implemented, there will be one entry point into the MCCSC Tech Prep prototype since it begins with the first year of high school. Currently entry is available at both 9th and 10th grades.

4. Team teaching and/or joint instructional planning across areas of instruction

Considerable effort has been expended to bring staff together for joint instructional planning; although team-teaching across instructional areas has not been used.

5. Teaching strategies which include application-based instruction, interdisciplinary instruction, and cooperative learning

The primary distinguishing characteristic between Tech Prep and the regular academic courses at Bloomington is the application-based instruction and use of various new teaching strategies. Such strategies include interdisciplinary teaching, cooperative learning, and accommodating different learning styles.

6. Learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills

Staff have been well trained in learning activities that emphasize problem solving, critical thinking, teamwork, and cooperative learning skills. The staff feels that such strategies are an integral part of Tech Prep.

7. Courses that are designed to promote mastery by being performance based

The curriculum is performance based via practical application activities. The 4 MAT System developed by Excel Inc. is being used as the basis for all curriculum development work. However,, complete implementation of performance based curriculum has not been achieved.

8. Core competencies delivered through specific courses or through integration across areas of instruction

Although there is some integration across areas of instruction most of the core competencies are taught through specific courses.

9. Locally determined recommendations for electives

There are locally developed electives for both the 9th and 10th grades including Keyboarding, Computer Applications, Introduction to Business, and Advanced Computer Applications. Although these courses are electives in the Bloomington Model, the competencies taught in them are listed as core competencies in the State Model.

IV. Match with State Model Levels

This section describes the extent to which Monroe County Community School Corporation has incorporated the three levels as described in the State Tech Prep Curriculum Model diagram.

Tech Prep Core

The first level of the State Tech Prep Model is referred to as the Tech Prep Core Curriculum. Core competencies can be delivered through specific courses or through integration across areas of instruction. For the most part, this level of the model has been well-developed and good progress is being made in implementing it in the Bloomington prototype.

Math - Demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies.

Introduction to Algebra courses for 9th and 10th grades (1-2 and 3-4) will equate to the first year of algebra competencies in the State Model.

Science - Demonstrate first year biology and first year physical science, physics and chemistry, competencies.

9th grade Physical Science is a combination of basic physics and chemistry principles. The 10th grade Biology 1-2 course is a comprehensive biology course taught through practical applications.

Language Arts - Demonstrate competencies reflecting four year of comprehensive English, including technical communication and technical literature competencies.

The 9th and 10th grade Language Arts courses are to provide "real-life" application of the language arts skills to the general education students. The curriculum places special emphasis on the interrelationship among Language Arts, Sciences and Math.

Keyboarding Computer Applications - Demonstrate basic competencies in keyboarding and computer applications.

Competencies in keyboarding and computer applications are taught in several Tech Prep courses and are taught specifically in recommended elective courses.

Introduction to Careers - Demonstrate an awareness of careers and an ability to examine current and evolving technical careers.

Career information is an integral part of the instruction in practically all of the Tech Prep courses. As a 9th and 10th grade level effort, Tech Prep is the only organized instructional program at Bloomington providing career information.

Economics.- Demonstrate competencies in applying economic principles.

Although many economic principles are provided in a number of the Tech Prep courses, there is no single course or set of principles being taught.

Specialized Tech Prep Curriculum

The second level of the State Tech Prep Model is referred to as Specialized Tech Prep Curriculum and consists of 3-5 courses related to the technical area of preparation. This level of the model has not been fully developed in the Bloomington prototype. Vocational and technical courses exist within the corporation but as of the 1990-91 school year have not been modified to reflect the Tech Prep strategies.

Post Secondary Articulation

The third level of the State Tech Prep model is Articulation with Post Secondary institutions. Development of this level of the model is just starting and has been limited to beginning efforts at joint curriculum planning. Long range plans include further development and articulation of all levels from grade nine through four years of higher education and/or career entry.

V. Conclusion

MCCSE, unlike the other four prototypes in the state, planned, developed and implemented Tech Prep at the 9th grade level. The total effort is in keeping with the intent of state legislation.

In summary, the Tech Prep prototype piloted at MCCSE is in compliance with almost all state guidelines and incorporates most of the features of the State Model. The first level of the State Model is in place (Tech Prep Core) in grades 9-10. The math core, as of the present, does not include first year geometry competencies nor probability and data analysis competencies. Economics principles/competencies are not taught in a specific course. The Bloomington plan is to proceed year by year from grade 9 through 12 in the core areas of Math, Science and Language Arts until the curriculum is fully implemented. Plans are being made to establish the second (Tech Prep Specialization) and third levels (Post secondary Articulation) in future years..

North Montgomery Community School Corporation

Linden, Indiana

I. Program Description

The Setting

The North Montgomery Community School Corporation is located in and serves the northern most parts of Montgomery County, Indiana. The county is one of eight counties that make up Ivy Tech--Region IV, Lafayette, Indiana, located in the east central part of the state.

Although the county would typically be considered rural, its economic base would probably be considered more industrial with many residents commuting to Indianapolis, Lafayette and Crawfordsville. Crawfordsville is the population center of the county and has a number of small to medium sized employers including R. R. Donnelley, its largest, employing approximately 2,000 persons.

The North Montgomery Community School Corporation is one of three school corporations in Montgomery County. It has a population of 22,000 to 25,000 with a K through 12th grade enrollment of approximately 2,000. The corporation has three elementary schools, one middle school, and one high school. The elementary schools have over 900 students enrolled in grades K-5. The middle school enrolls approximately 450 6th through 8th graders and the high school enrolls approximately 600 students annually. All of the facilities are relatively new providing adequate space and a good learning environment.

The high school, although twenty years old, is an attractive, large facility in excellent condition with an atmosphere that reflects a student body, faculty and community who are proud of their school. The students reflect a middle to lower middle class socioeconomic status. The high schools' curriculum would be considered comprehensive even though the school is a small rural one by today's standards. Approximately 25 percent of the school's enrollees are considered college prep with another 10 percent who would matriculate to two-year post secondary schools and/or the military. Although the school participates in a vocational cooperative, only a few students are enrolled in a limited number of programs. A number of courses are offered in the school which are vocational in nature or culminate in students entering the work force in related areas.

Program Goals and Objectives

The following goals were identified in the original Region IV proposal but were expanded upon during the 1989-90 school year. Those additional goals are included immediately after the first three identified goals.

- ☐ An articulated curriculum design which will prepare students for employment clusters in business occupations, health occupations, or the technologies.

- Delivery systems which can work successfully in various types of secondary schools, from metropolitan to rural.
- A marketing program to promote the concept of the Tech Prep curriculum among secondary students who have previously chosen the general curriculum rather than vocational education or the college prep curriculum.
- Articulation agreements with post secondary institutions
- Student participation in Tech Prep program to increase during the test pilot period.
- Alternative programs will provide students increased opportunities to make appropriate curriculum choices.
- Students completing the Tech Prep curriculum will have enhanced their employability.
- Students completing the Tech Prep curriculum will pursue post secondary education to a higher level of success than those completing a college prep program.

Currently these goals and objectives are being refined to better reflect the Tech Prep effort as it evolves at North Montgomery High School.

Curriculum

During the first pilot year, North Montgomery High School had the most occupationally integrated Tech Prep efforts of the state's pilot sites. The core courses were developed primarily as they related to Business Education which was one of the occupational areas identified as part of the original proposal. As the year progressed, the competencies taught in the original courses were expanded becoming generic to all Tech Prep students.

Following are the courses in the Tech Prep Core and Technology Specific Curriculums:

Tech Prep "Core" Courses

English 9-10-12
 Oral/Written Communication 11
 Science 9-10
 Mathematics 9-10
 Probability/Statistics 12
 Keyboarding 10
 Business Computer Applications 11-12
 Economics Tech Prep 12

Human Relations 11-12

Tech Prep Technology Specific Courses

General Business Tech Prep

Introduction to Business

Business Law

Business Computer Applications 2

Business Management

Information/Data Management Tech Prep

Word/Information Processing

Office Procedures

Advanced Business

Business Computer Applications 2

Manufacturing Technology Program

Introduction to Technology

Drafting 1 & 2

CAD

Manufacturing Technology

Introduction to Business

Students

During the first year, 34 students were recruited from the general track curriculum approximately one week prior to the start of the 1989-90 school year. This was due to the lateness of the project approval. A total of 64 students were pre-enrolled for the 1990-91 school year. It is felt that the year two enrollees are better informed about the Tech Prep opportunities than were the first year students. Of the 62 students enrolled in year two, 24 are enrolled in the second year sequence with 38 enrolled for the first time.

Students are asked to switch from a General Studies Curriculum as depicted in their 4 Year Plan. These plans are developed as the student enters high school and involve the student, parents and counselors.

Annually, during December and January, counselors review each student's course selection for the coming semester as well as their tentative selection for the next school year. If a student is not focused on a curriculum the counselor uses this opportunity to discuss the Tech Prep Curriculum.

Faculty

Eleven teachers were involved in Tech Prep during the first pilot year, although only 2 of 11 had a Tech Prep class with a concentration of Tech Prep students. Of the remaining teachers, one had three of the Tech Prep students in a class with other students. The majority of the teachers, although involved in staff meetings and inservice activities, were developing curricula for year two of the pilot.

During the second year of the pilot, 12 teachers were involved in teaching the Tech Prep Core and Specialized Courses. The majority of the staff taught the Tech Prep Specialized Courses. All staff are licensed in their subject matter area and, for the most part, seem enthused about the changes being made.

In addition to the 12 teachers, a manager is part of the Tech Prep staff. Although located in the Central Administrative facility, away from the high school, the Project Manager visits the project frequently and has established an internal and external communications system. During year two, one of the teachers provided on-site coordination and was designated as the Project Coordinator.

II. Compliance with State Guidelines

The following statements describe the extent to which North Montgomery High School's Tech Prep prototype is meeting the State Model Guidelines.

1. Target students in a general unfocused program of studies

The Tech Prep Curriculum at NMHS is targeted toward those students typically enrolled in an unfocused secondary program. Staff and counselor recruitment efforts have been directed to such students. The published goals of these efforts are to increase student motivation and achievement in basic skill and technology specific areas in applied courses of math, science, language arts, and business and manufacturing technologies to enable more students to attend post secondary education or to increase work readiness.

2. Involve local business, industry and labor

Local business, industry, and labor have been actively involved in planning, delivery and evaluation of the Tech Prep curriculum as members of the Tech Prep Advisory Committee. The Committee is comprised of a cross section of individuals from the area's private sector. As the committee members continue to review and provide input on refinements of the total curriculum, they have exhibited more enthusiasm and support for the effort and increased their involvement.

3. Develop individual student plans of study

All 8th graders are required, in consultation with the guidance counselor and parents, to have a 4 Year Plan. The planning process is undertaken with careful consideration given to career interests, future plans relative to college, and entering the world of work directly from high school, or entrance into a post secondary training program.

4. Include articulation agreements between secondary and post secondary institutions

As of April 1990, articulation agreements with post secondary education institutions had not been executed; although a number of courses from the Business and Manufacturing Technologies program have been identified as potential advanced standing courses. Further, a draft articulation agreement is currently being reviewed by both the high school and Ivy-Tech. Initial efforts have commenced with Indiana State University and Vincennes University to execute agreements.

5. Incorporate a staff development process

Due to the late approval of the first year project, professional development activities, for the most part, had to be conducted after the start of school. However, for the second year, a needs assessment was conducted and activities planned to commence in June of 1990. Included in the planned activities were attendance at local, regional and state conferences, inservice workshops sponsored and conducted by Indiana University, Indiana State University, and IVTC. Also, 3 of 12 teachers participated in the Tech Prep Cadre training which they assessed as excellent professional training.

III. Incorporation of State Model Features

The following statements describe the extent to which NMHS has incorporated the State Tech Prep Model Features into their prototype.

1. A secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness taught through practical applications

Representatives from both secondary and post secondary education were assigned to a Task Force. These groups created the model, designed the curriculum, developed the courses and planned the teaching strategies. All courses developed are competency and application based. They include math, language arts and computer applications. Science will be included as a core course beginning in 1991-92 school year. All Tech Prep courses include career information. Economics Tech Prep is required as part of the core.

2. An articulated secondary-post secondary curriculum

Although, as of Spring 1991, an articulation agreement has not been executed, potential advanced standing courses at IVTC were being reviewed during 1990-91.

3. Multiple entry points

Students may currently enter the Tech Prep Curriculum at NMHS during either their 11th or 12th grade. Beginning in 1991-92 entry into Tech Prep may occur from 9 through 12.

4. Team teaching and/or joint instructional planning across areas of instruction

Although formal team teaching has not been implemented, non-scheduled team teaching in business and joint instructional planning across math, language arts, business and manufacturing technologies has been on-going.

5. Teaching strategies which include application-based instruction, interdisciplinary instruction, and cooperative learning

Each Tech Prep course uses application methodologies including small group work, demonstrations, shadowing, cooperative learning, and project oriented instruction.

6. Learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills

Tech Prep courses at North Montgomery include learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills. In practically all courses, team work and cooperative skills are emphasized via group work. Problem-solving and critical thinking skills are especially emphasized as an integral part of application-based instruction.

7. Courses that are designed to promote mastery by being performance based

All courses have been developed or modified to be performance based with advice and consent from the Private Sector Advisory Committee. A competency checklist for students exists for each course.

8. Core competencies delivered through specific courses or through integration across areas of instruction

Core competencies are provided for in specific courses (e.g.; Oral and Written Communications, Algebra, Computer Applications) and through integration across areas of instruction.

9. Locally determined recommendations for electives

Electives in the Business and Manufacturing Technologies areas have been identified by the Secondary, Post secondary Task Force and Private Sector Advisory Committee.

IV. Match with State Model Levels

This section describes the extent to which NMHS has incorporated the three levels as described in the State Tech Prep Curriculum Model Diagram.

Tech Prep Core

The first level of the State Tech Prep Model is referred to as the Tech Prep Core Curriculum. Core competencies can be delivered through specific courses or through integration across areas of instruction. With the exception of science, for the most part, this level of the Model has been well-developed and is in place at North Montgomery.

Math - Demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies.

First year algebra and a semester of probability and data analysis are required. Geometry is now required in the North Montgomery model. Prior to the 1991-92 School Year, geometry competencies were included in a combined Algebra and geometry class.

Science - Demonstrate first year biology and first year physical science, physics and chemistry, competencies.

Four semesters of biology, physics and chemistry as part of the core competencies are required and will be part of the North Montgomery Tech Prep curriculum beginning in school year 1991-92.

Language Arts - Demonstrate competencies reflecting four years of comprehensive English, including technical communication and technical literature competencies.

Tech Prep students are required to take three years of English in addition to the the Oral and Written Communications course (taken in the 11th grade) which includes competencies in both writing and speaking with emphasis on business and technical writing and presentations.

Keyboarding/Computer Applications - Demonstrate basic competencies in keyboarding and computer applications.

A keyboarding course is a prerequisite to the Tech Prep Business Computer Applications course. The applications course requires demonstrated competencies in several business applications. Both courses are required for all Tech Prep students.

Introduction to Careers - Demonstrate an awareness of careers and an ability to examine current and evolving technical careers.

All Tech Prep courses are responsible for providing career information which ranges from career materials to field trips. Shadowing in the introductory courses is used as a career counseling tool. Additional career information is provided by the counseling staff and individual Tech Prep teachers act as mentors for Tech Prep students.

Economics - Demonstrate competencies in applying economic principles.

Economics Tech Prep is required as part of the core. The instruction is focused on the application of practical economic principles.

Specialized Tech Prep Curriculum

The second level of the State Tech Prep Model is referred to as "Specialized Tech Prep Curriculum" and consists of 3-5 courses related to the technical area of preparation. The second level of the Tech Prep Model has been developed by NMHS in the occupational areas of Business and Manufacturing. The Task Force and staff have developed two sequences in Business and one in Manufacturing with potential post secondary advanced standing courses being identified. Competencies and application-based teaching methodologies have been developed for the Specialized Tech Prep courses.

Post Secondary Articulation

The third level of the State Tech Prep Model is "Articulation with Post Secondary Institutions". Articulation efforts are being pursued for the NMHS prototype at Ivy-Tech, Indiana State University, Vincennes University and Purdue University. However, additional efforts are needed to provide for smooth matriculation of the students.

V. Conclusion

In conclusion, NMHS has, during the past three years, planned, developed and implemented a Tech Prep Curriculum that is evolving from one which was heavily integrated into the high school Business Education curriculum to a core of courses and competencies that will benefit all general education, unfocused students. The effort is being well supported with the recent change of high school principals. Additional teachers (non-project) are becoming interested and involved in the concepts and strategies.

More and more rural school corporations are looking to NMHS as the Tech Prep Model to implement which is indicative of the great strides made by the project staff during two short years. The three teacher nucleus has provided enormous effort to establish a viable alternative for the majority of NMHS students.

Metropolitan School District of Wayne Township Indianapolis, Indiana

I. Program Description

Setting

The Metropolitan School District of Wayne Township constitutes the western boundary of the city of Indianapolis and Marion County, Indiana.

Wayne and the surrounding townships provide a varied and diverse socioeconomic combination of industrial complexes, apartments, condominiums, country clubs, parks, and single family dwellings. Because of its central location, the township enjoys a sound economic base and is populated by a number of wealthy families as well as some of the poorest city residents.

The district has 11 elementary schools, 3 middle schools which include grade nine, and Ben Davis High School which consists of over 2,500 10th through 12th graders. Unique to Ben Davis is the containment of an area vocational school that serves 10 other districts high schools. The district has been stable for years but is recently experiencing an enrollment growth that should stabilize in the early nineties.

The close proximity to a large metropolitan area is an added advantage, making possible many cultural opportunities as well as diverse employment opportunities, a majority of which require less than a baccalaureate degree.

The community, although suburban/rural in nature, is fortunate to be provided a vast array of post secondary educational institutions; such as IVY TECH, Indiana University, Purdue University, Butler University and others.

Program Goals and Objectives

The goals and objectives submitted to the state for this pilot are as listed:

- ☐ To develop specific performance based curriculum modules for T.P. Physics, T. P. Math, T. P. Communications and T.P. Chemistry.
- ☐ To develop a specific recruitment process which will target those students who will benefit most from the Tech Prep program.
- ☐ To initiate an inservice training workshop for secondary and post secondary instructors, administrators, and project staff to include awareness of the pilot design and implementation process.
- ☐ To implement a marketing/public relations plan which will create public awareness of the Tech Prep curriculum.

- ❑ To develop strategies and specific lesson plans for the implementation of an Introduction to Careers in Technologies course designed to be included in the second year of the pilot.
- ❑ To continue curriculum articulation efforts between the secondary and post secondary schools.
- ❑ To implement an evaluation plan that will be used in the development of a successful competency based technical curriculum.
- ❑ To establish a clear communication linkage between the various pilot site, secondary, and post secondary faculty and all action committees to ensure that the pilot site tasks are completed and monitored as necessary.
- ❑ To pilot the Tech Prep project at Ben Davis during the 1989-90 school year.
- ❑ To increase the number of Ben Davis students who are prepared to enter post secondary education.
- ❑ To increase math, science, and communication skills of students who enter the work force immediately after graduation from Ben Davis High School.
- ❑ To enhance student understanding of technical concepts as related to new and emerging technologies.
- ❑ To increase problem solving and critical thinking skills of general education students.
- ❑ To enable students to set obtainable educational and career goals which will increase secondary retention and completion rates.

Curriculum

The curriculum offered at Ben Davis is based on the goal to better prepare today's secondary student to live and work in an ever advancing technological society. Ben Davis High School offers a curriculum that is the very core of teaching students a technological foundation if one accepts the definition of technology as being knowing, thinking, and doing. The first courses to be offered were math, chemistry, physics, and English and are still being taught as applied, performance based instruction.

The courses are taught in a three period block of time in a lab that is specifically designed for Tech Prep instruction. Although the three hour block of time is not team taught, it nevertheless facilitates an integration of subject matter. The three hour block also permits the students to develop a rapport and close relationship with the faculty.

To insure that the instruction is performance based, the faculty developed, with the assistance of the Vocational Director, a performance matrix that charted students' achievement of competencies. Assistance was sought from local businesses, post

secondary instructors, and local vocational teachers to ensure practical, real work application of the instruction.

The core curriculum is depicted below as it will exist in year three. The primary difference from year two will be the offering of the core at the sophomore year.

Year One

- Tech Prep Math
- Tech Prep Science
- Tech Prep Computer Applications
- Introduction to Careers in Technology

Year Two

- Tech Prep Science
- Tech Prep Math
- Tech Prep Communications
- Specific Technology Elective

Year Three

- Specific Technology Elective

The Technology Specific electives are vocational and/or industrial technical courses that have not yet been modified to incorporate the Tech Prep strategies or concepts.

Students

The student selection criteria at Ben Davis High School are as follows:

- Sophomore Geometry failures or drop outs
- Pre-Algebra B and C students
- Freshman Algebra C and D students
- Sophomore Algebra C and D students
- Not enrolled in College Prep curriculum
- Middle two quartiles
- Biology 1 & 2
- Keyboarding

The first year pilot enrolled 23 students with 18 finishing the first semester. Twelve enrolled for the second year. Twenty-two students are enrolled in the first year curriculum during year two of the pilot. Total enrollment in the 2-year core curriculum is 34.

Faculty

Staffing for the Tech Prep Core curriculum at Ben Davis consists of five teachers. The teachers are physics, chemistry, math, English, and industrial technology specialists licensed by the State of Indiana. All teachers are adept at using the computer as a teaching tool and 3 of the 5 are teaching their second year in the Tech Prep Curriculum.

During the 1990-91 school year one of the teachers, Rick Adcock, also served part-time as the Project Manager.

II. Compliance with State Guidelines

The following statements are intended as a description of how and if Ben Davis High School is meeting the State Model Guidelines.

1. Target students in a general, unfocused program of studies

The project staff, administration and counselors have targeted their student selection and recruitment efforts to those students who are enrolled in a general education track and are not considered College Prep; have had Algebra and at least Biology 1 & 2; are typically in the middle two quartiles, and who have interest in technical careers. The goals of such efforts are to encourage and prepare students for post secondary career programs or entrance into the work force with potential to be employed in a technical job.

2. Involve local business, industry and labor

Local business, industry and labor have been actively involved in the planning, delivery and evaluation of the curriculum through representation on the project's committee structure for planning, curriculum development, and implementation. The Curriculum Development Committee has 5 subcommittees, one for each of the 5 core courses with private sector representation on each subcommittee. The private sector continues to identify and verify needed competencies, practical applications and provide both personnel and material assistance.

3. Develop individual student plans of study

Ben Davis High School, like a number of other school corporations in Indiana, requires a plan for students that outlines their secondary education curriculum. The plan is based on career interests, goals, and abilities.

4. Include articulation agreements between secondary and post secondary Institutions

An articulation agreement between Ben Davis High School and IVTC - Central Indiana has been executed. The agreement identifies advanced credit courses and those courses in which the student will be eligible to enroll after being admitted to IVTC. Work is continuing on agreements with IUPUI, Vincennes University and Indiana State University.

5. Incorporate a staff development process

Professional development needs have been identified and activities established to meet the staffs' needs for both the 1989-90 and 1990-91 school years. Activities include inservice on curriculum development, computer and electronic equipment, audio-visuals, robotics, etc. Additionally, non-project teachers have been provided Tech Prep workshops.

III. Incorporation of State Model Features

The following statements depict whether or not Ben Davis High School has incorporated the State's Tech Prep Model Features into their Tech Prep efforts.

1. A secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness, taught through practical applications

Using secondary, post secondary and private sector representation, Ben Davis has developed a secondary school core consisting of math, chemistry, physics, communications, Introduction to Careers in Technology and Computer Applications. These core courses are distinguished from the traditional classes primarily through the use of application based instruction. Many economics principles (competencies) are provided in Tech Prep courses.

2. An articulated secondary-post secondary curriculum

Post secondary instructors and Ben Davis Tech Prep teachers have met periodically to attempt to establish an articulated curriculum and some progress has been made. An Articulation Agreement between Ben Davis High School and IVTC has been executed and one is being considered with IUPUI, ISU, and Vincennes.

3. Multiple entry points

Currently, the established core taught at the 11th and 12th grade levels does not seem to permit multiple entry points for students. As the curriculum is implemented at the 10th grade level during 1991-92 this will be feasible.

4. Team teaching and/or joint instructional planning across areas of instruction

Fortunately, the Tech Prep staff have been afforded concurrent planning periods which has greatly facilitated joint instructional planning. Additionally, the Tech Prep students are grouped and taught in block time periods which has facilitated interdisciplinary instruction and some team teaching efforts.

5. Teaching strategies which include application-based instruction, interdisciplinary instruction, and cooperative learning

Different and innovative teaching strategies have been more easily implemented at Ben Davis High School than at other sites due to the staffs' common planning time, student grouping, block time period and a Tech Prep laboratory for all instruction. Cooperative learning interdisciplinary instruction, competency mastery, and, most prevalent, application based instruction are some of the strategies used.

6. Learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills

Teaching teamwork and cooperative skills, as well as emphasizing problem solving and critical thinking are integral parts of the Tech Prep competency based instruction at Ben Davis High School.

7. Courses that are designed to promote mastery by being performance based

All Tech Prep Core courses are performance based. Students are tested for application of competencies as well as through traditional paper and pencil tests.

8. Core competencies delivered through specific courses or through integration across areas of instruction

Core competencies are taught primarily within specific courses, e.g., Tech Prep Math, Chemistry, Physics and Communications although integration across subject areas does occur. Economics competencies are taught through integration across areas of instruction.

9. Locally determined recommendations for electives

Ben Davis High School has determined and identified elective courses in all of the vocational and practical arts areas.

IV. Match with State Model Levels

This section describes the extent to which Ben Davis High School has incorporated the three levels as described in the State Tech Prep Curriculum Model diagram.

Tech Prep Core

The first level of the State Tech Prep Model is referred to as the Tech Prep Core Curriculum. Core competencies can be delivered through specific courses or through integration across areas of instruction. For the most part, this level of the Model has been well-developed and is in place at Ben Davis High School.

Math - Demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies.

First year algebra is a prerequisite to the Tech Prep Core Curriculum. The 2 years of Tech Prep Math consists of Geometry, Algebra and Trigonometry. Probability and data analysis competencies are taught in the second year of Tech Prep math.

Science - Demonstrate first year biology and first year physical science, physics and chemistry, competencies.

The two years of Tech Prep Science consist of practical application based instruction in Chemistry and Physics. Biology is a required course for all students at Ben Davis. As such, it is a prerequisite to chemistry and physics for Tech Prep students.

Language Arts - Demonstrate competencies reflecting four year of comprehensive English, including technical communication and technical literature competencies.

The one year course in Tech Prep Communications includes reading, writing, listening, and speaking skills development via practical application especially as it relates to the technical areas.

Keyboarding/Computer Applications - Demonstrate basic competencies in keyboarding and computer applications.

Currently the Computer Applications course is not required nor is it considered a part of the Tech Prep Curriculum. Keyboarding is required of all 9th grade students in the township. A full one year Tech Prep Computer Applications course has been developed and will be an integral part of the 10th grade curriculum next year.

Introduction to Careers - Demonstrate an awareness of careers and an ability to examine current and evolving technical careers.

Currently, career information is provided during year 2 in an Introduction to Technologies course. Next year the Introduction to Careers in Technology course will be offered as one of the new 10th grade Tech Prep courses with career information included as an integral part of the content.

Economics - Demonstrate competencies in applying economic principles.

Some economic principles are now being offered in the Tech Prep Communications and Introduction to Careers in Technology courses. Additionally, some principles will be offered next year in the new sophomore Tech Prep courses, specifically Computer Applications.

Specialized Tech Prep Curriculum

The second level of the State Tech Prep Model is referred to as Specialized Tech Prep Curriculum and consists of 3-5 courses related to the technical area of preparation. This level of the Model has not been totally developed at Ben Davis High School. Courses in all vocational and practical arts programs have been identified, but as of the 1990-91 school year have not been modified to reflect the Tech Prep strategies.

Post Secondary Articulation

The third level of the State Tech Prep Model is Articulation with Post Secondary Institutions. Good progress is being made at Ben Davis High School related to post secondary articulation. Articulation efforts have been pursued and agreements are in place with IVTC, Indiana University Purdue University in Indianapolis, Indiana State University and Vincennes University.

V. Conclusion

In summary, the Tech Prep prototype piloted at Ben Davis High School is in compliance with state guidelines and incorporates almost all of the features of the state Model. The first level of the state Model is nearly in place (Tech Prep Core) and progress is being made to further establish the second (Tech Prep Specialization) and third levels (Post secondary Articulation).

Project staff at Ben Davis High School have concentrated their efforts during the past two years on the basic education skill areas of math, chemistry, physics, communication and technology literacy. Consequently, a solid Tech Prep Core has been developed and implemented. During the 1991-92 School Year this core will be expanded and offered to the incoming students, who are sophomores, at Ben Davis High School. At the same time, the Specialized Tech Prep Curricula will be expanded to include Business and Health Occupation sequences.

School City of Mishawaka
Mishawaka, Indiana**I. Program Description****The Setting**

The School City of Mishawaka, Indiana is located in the northern Indiana city of Mishawaka which is a twin city to South Bend, Indiana. Ivy Tech--Northcentral, the post secondary vocational education college, is located approximately 12 miles from MHS. The location is an urban area with a projected population of nearly 245,000.

From 1970 to 1987, the South Bend--Mishawaka MSA changed from an economy dominated by manufacturing to a service-based economy. Manufacturing jobs fell from 37 percent to 22 percent. Service related employment rose from 58 percent to 71 percent. The number of jobs in health services totaled 9,300 in April, 1987, making health the area's largest service industry. Similar dynamic changes are occurring in other occupations particularly in the more sophisticated technological manufacturing and business fields. Since 1987 a number of small businesses with fewer than 50 employees, have opened.

Mishawaka High School is a comprehensive, modern educational institution containing grades 9 through 12 and enrolling approximately 1,600 secondary students. The high school is an extraordinary facility that is well maintained. The pleasant attitude of both students and staff provides for an excellent learning atmosphere.

Program Goals and Objectives

The goals as developed during the planning phase continue for the second year and are as follows:

- Design an articulated curricular model beginning in high school and continuing through two years or more of college which provides logical exit and entrance options for students.
- Develop a new curricular option that is performance based and uses applied teaching strategies to prepare students for a broad spectrum of career opportunities.
- Identify a common core of competencies required in allied health occupations, that can be periodically updated to meet new or emerging needs.
- Develop a comprehensive marketing and career guidance program, starting in the lower grades, and inform students, parents, community groups and the general public about the Tech Prep program.

- Develop an in-service training and development plan for secondary and post secondary faculty, counselors and administrators to ensure that the Tech Prep curriculum is implemented as successfully as possible.

The specific objectives for pilot year two activities are as follows:

- Continue implementation and refinement of the Tech Prep Core courses originally piloted in pilot year one;
- Implement a new Tech Prep Core course, "Student Success Skills" to be offered at the freshman level;
- Complete the revision and development, as well as implementation, of the Technology Specific curricula in the area of Health, Engineering/Manufacturing, and Business;
- Continue and expand in-service activities to include new TECH PREP faculty as well as adding topics of demonstrated relevance to our program;
- Purchase and install equipment for the Technology Specific curricula;
- Continue and expand marketing activities to students, parents, teachers and the community.

Curriculum

Mishawaka's first year curriculum reflects a core or foundation for the understanding of technology as well as the teaching of basic education skills. The courses taught during the first pilot year attempted to incorporate applied, performance based instruction. The developmental stage included input from staff at both the secondary and post secondary levels of education and from private sector representatives. The curriculum is based on the competencies needed in Health, Business, and Engineering occupations.

The courses are taught in laboratories that were modified to be more conducive to Tech Prep concepts and strategies. The classes are one period per day for five days per week.

Year One Curriculum

Computer Applications
Physical Science I & II
Communications I & II
Math for Technology
Principles of Technology

Year Two Curriculum

During year two of the pilot, the new courses that were included in the overall Tech Prep curricula are primarily those in the three locally selected Technology Specific occupational areas of Business, Health, and Engineering/Manufacturing. These courses, for the most

part, were already offered in the school's curriculum. However, they were modified during the previous school year and summer to incorporate the Tech Prep strategies.

The technology specific courses are:

Applied Engineering/Manufacturing Technologies

- Math for Technology II
- Drafting I & II
- Electronics I & II
- Introduction to Manufacturing Technology
- Principles of Technology III & IV

Business Technology

- Accounting I & II
- Business Equipment I
- Introduction I & II
- Business Practices I
- Business Law I

Health Technology

- Careers in Health Technologies
- Chemistry for Technologies (a new course also part of Applied Engineering/
Manufacturing Technologies Program)

In addition to the core (first year) and Technology Specific (second year) courses, a new course for ninth graders has been developed and was piloted this school year as part of the Tech Prep Curricula. The course is titled "Student Success Skills" and is designed to teach students reading and studying skills. Formal study skill methods such as SQ3R, EVOKER, REAP, SQRQCQ, and PANORAMA were introduced and practiced. Techniques for reading and interpreting charts, graphics, tables, diagrams, and pictures were introduced along with retention factors and test taking strategies.

Students

The Tech Prep staff, including the school administration, established a goal for the recruitment and selection process of 20 to 24 students per course in the "Core". The selection criteria include general education track, mid-range ability level, and technical career oriented.

By the time second year recruitment and selection commenced, the Tech Prep technology specific courses already had student enrollments totaling 104. These students, although

not necessarily general track, would meet two of the three selection criteria, ability level and technical career oriented.

Another goal of the enrollment process is to enroll students, whenever possible, in an entire Tech Prep track as opposed to one individual course. During the pilot phase this has not been possible at times.

First year Tech Prep core students numbered 68 at the start of the year with approximately 80% of them coming from the general education track.

Faculty

Staffing for Tech Prep at Mishawaka High School consists of three managerial/ancillary positions (manager, coordinator, and secretarial/marketing) and eleven teaching positions. The Site Coordinator and Secretarial/Marketing positions also have some teaching responsibilities.

The teaching staff consists of the core course teachers, one or two freshman subject teachers and the technology specific course teachers. All thirteen Tech Prep teachers are experienced and licensed in their subject matter by the State of Indiana. All staff share a willingness to change and remain dynamic, constantly working to improve their teaching strategies.

To facilitate Mishawaka High School's acquisition of ownership of the Tech Prep effort, the management has been modified for the second year pilot. Although IVTC - Northcentral is the administering agency, the Project Manager has fewer responsibilities during year two. A Mishawaka High School Tech Prep faculty member is currently serving as an on-site coordinator which seems to be enhancing the second year pilot effort.

In addition to the managerial changes, the former secretarial position has been modified to include marketing and teaching responsibilities. This staff person coordinates the recruiting and marketing efforts and teaches the new freshman Student Success Skills course. The personnel changes seem to be serving Mishawaka High School, IVTC and the project very well.

II. Compliance with State Guidelines

The following statements describe the extent to which Mishawaka High School is meeting the State Model Guidelines.

1. Target students in a general, unfocused program of studies

The project staff, guidance counselors and administration have targeted their student recruitment and selection to those students neither enrolled in a college prep or vocational

education track but who are typically enrolled in an unfocused program of studies. The goal is to provide the students with the skills and knowledge necessary to enroll in a post secondary occupational program or to successfully enter the workforce.

2. Involve local business, industry and labor

Local business, industry and labor have been actively involved in the planning, delivery and evaluation of the curriculum through a variety of activities. MHS has a extensive active project committee structure. The responsibilities range from recruitment and public relations to evaluation. All committees involve community private sector representatives. The staff also has made extensive use of the DACUM process in the identification and development of Tech Prep courses and competencies. This has required the involvement of a very large number of personnel from the private sector. Business representatives have served in many ways, in addition to advisory, including providing personnel, materials, and their own facilities in support of the Tech Prep effort.

3. Develop individual plans of study

As ninth graders, the Tech Prep students, in consultation with their counselors, parents, and Tech Prep Coordinator, develop a "Course of Study" that contains post high school goals and an occupational area of interest. As the students' plans change, the parents must be informed and approve of the changes. The counseling staff use this plan throughout students' secondary career as a guide.

4. Include articulation agreements between secondary and post secondary institutions

An articulation agreement was executed in April of 1990 between IVTC and MHS that provides for advanced placement and dual credit. Additionally, the agreement calls for orienting all faculty and administrators to the articulation process entered into by both parties. Courses in three occupational curricula have been identified as dual credit or advanced placement.

5. Incorporate a staff development process

Mishawaka High School recognized at the outset of the project the need for a strong continuous professional development plan and process. In addition to providing project personnel with a number of different professional development activities such as; intensive summer in-services; attendance at relevant conferences, consultant contracting, etc., MHS has expended time and effort in informing and orienting all faculty to the effort. A Staff Development Plan is developed each year with input from the staff involved.

III. Incorporation of State Model Features

The following statements describe the extent to which Mishawaka High School has incorporated the features of the Tech Prep State Model into their Tech Prep prototype.

1. A secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness taught through practical applications

Mishawaka's curriculum reflects a core of basic education competencies. Using voluntary teachers and community representatives MHS and IVTC have developed a core of Tech Prep courses providing mathematics, science, language arts and computer literacy competencies. Economics and career awareness competencies are integrated throughout courses. The competencies are taught primarily through practical applications.

2. An articulated secondary-post secondary curriculum

MHS and IVTC executed an articulation agreement in April 1990 and have proceeded to identify dual credit courses and advanced standing courses within their three occupational areas.

3. Multiple entry points

The Tech Prep curriculum has been designed to permit easy entry and exit at various points (primarily each semester) in the four years of high school.

4. Team teaching and/or joint instructional planning across areas of instruction

Although there has been some joint instructional planning across the academic and occupational subject areas, team teaching has not been utilized.

5. Teaching strategies which include application-based instruction, interdisciplinary instruction, and cooperative learning

Mishawaka High School has incorporated a number of teaching strategies into its Tech Prep effort including cooperative learning in Communication and Science courses and interdisciplinary instruction between Math, Science and Computer Application courses. Instruction is primarily application based and is the distinguishing feature between Tech Prep and the traditional academic courses.

6. Learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills

The teaching of problem-solving, critical thinking, and teamwork have been well incorporated into the Tech Prep program through application based instruction and grouping or pairing of students in most courses. Critical thinking and teamwork are most apparent in the technology specific courses.

7. Courses that are designed to promote mastery by being performance based

All instruction was developed as performance based and students are evaluated on their mastery of competencies. If a specified level of performance is not achieved by the students, they are not permitted to move ahead in the course.

8. Core competencies delivered through specific courses or through integration across areas of instruction

See number 7 above. Competencies were identified by the Mishawaka High School using the DACUM process. They are delivered, for the most part, in specific courses.

9. Locally determined recommendations for electives

In cooperation with IVTC, Mishawaka High School has identified the three occupational areas of Business, Health and Engineering/ Manufacturing based upon the area's labor market needs as determined by the private sector council.

IV. Match with State Model Levels

This section describes the extent to which Mishawaka has incorporated the three levels as described in the State Tech Prep Curriculum Model diagram. Recommended electives have been identified to supplement core courses in each of the areas.

Tech Prep Core

The first level of the State Tech Prep Model is referred to as the Tech Prep Core Curriculum. Core competencies can be delivered through specific courses or through integration across areas of instruction. For the most part, this level of the model has been well-developed and is in place at Mishawaka

Math - Demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies.

First year algebra is required prior to enrolling in the Tech Prep Core Curriculum. The Tech Prep math offering in the Core includes competencies in Algebra II, Geometry, probability, and data analysis.

Science - Demonstrate first year biology and first year physical science, physics and chemistry, competencies.

First year Biology is required prior to entry into the Tech Prep Core. The Tech Prep Science courses provide competency development in Chemistry and Physics.

Language Arts - Demonstrate competencies reflecting four year of comprehensive English, including technical communication and technical literature competencies.

The Applied Communications course includes competencies in all language arts skills including listening as well as reading, writing and speaking.

Keyboarding/Computer Applications - Demonstrate basic competencies in keyboarding and computer applications.

Keyboarding is a required prerequisite to the Computer Application course which is a Tech Prep Core Course. The Applications course requires the student to demonstrate a specific competency level in six different applications.

Introduction to Careers - Demonstrate an awareness of careers and an ability to examine current and evolving technical careers.

All of the Tech Prep Core Courses include career information for students. Additional information is provided in the occupational specific courses. Career information is also incorporated into the new 9th grade course entitled Student Success Skills which is taken by all Tech Prep students.

Economics - Demonstrate competencies in applying economic principles.

As of yet, Mishawaka has not incorporated specific economic principles into the Tech Prep curriculum. Staff is working on the integration of economic principles into existing courses.

Specialized Tech Prep Curriculum

The second level of the State Tech Prep Model is referred to as Specialized Tech Prep Curriculum and consists of 3-5 courses related to the technical area of preparation. This level of the model has been well developed by MHS and IVTC. Using projected labor market needs and input from private sector representatives Business, Health, and Engineering/Manufacturing Technologies were chosen. Using the DACUM process competencies, and consequently, courses were identified that would be offered at MHS. Additionally, those competencies and courses were identified that would be provided by the IVTC. The advanced placement and dual credit courses were also identified. The Specialized Tech Prep courses were identified previously.

Post Secondary Articulation

The third level of the State Tech Prep Model is Articulation with Post Secondary Institutions. Articulation agreements are being developed for the three occupational areas with IVTC - Northcentral. Additional agreements are being worked on with Southwestern Michigan College and Michiana College. An articulation agreement has been established with IVTC - Northcentral for the health career Tech Prep program.

V. Conclusion

In summary Mishawaka High School and IVTC-Northcentral have over the past three years planned, developed, and implemented an exemplary prototype Tech Prep curriculum. The effort involved many staff, administrators, parents, students, and private sector representation. The high school core and technology specific courses are well articulated with post secondary technology programs. While vastly improving the opportunity for high school aged youth to prepare for employment and/or continuing education and employment training the effort has improved the internal and external relationships of the school. Today there is greater communication among the staff as well as more communication with post secondary instructors. Also, the effort has greatly enhanced the corporation's relationship with the private sector community within the area.

Bartholomew Consolidated School Corporation

Columbus, Indiana

I. Program Description

Setting

Bartholomew County located in south central Indiana, has an estimated population of 67,000 people. The growth rate is expected to slow through the year 2000. Urban areas make up 48% of that population, while 52% are listed as rural.

Until 1979, graduates of the Bartholomew County high schools counted on getting jobs with a major local industry. With the growing reality of international competition, that secure knowledge of the potential for a well paying job and benefits began to disappear. Bartholomew County's economic base has been in transition for many years from a predominantly heavy manufacturing base to a more diverse, service-oriented base. Emphasis now is on businesses that can change quickly and still respond to customer demands. Service industries, in particular, are greatly affected by technology.

Bartholomew County has a large student population ranging from the most to the least gifted who need better preparation for the post high school job market. Bartholomew Consolidated School Corporation has 11 elementary schools, two middle schools, and two four year high schools. Columbus North High School is the older of the two and has an enrollment of approximately 1900 students. It is a comprehensive high school and serves as an area vocational center for four additional high schools in the area. Columbus East is also a comprehensive high school with an enrollment of approximately 1300 students.

Program Goals and Objectives

Each of the Technology preparation curricula within the BCSC prototype is focused on achieving the following goals and objectives:

Goals

- ☐ Prepare students to become citizens who are able to use the technology of today's world to enhance the quality of life in the community, the state, and ultimately the nation.
- ☐ Encourage students to acquire academic and job skills in an effective and efficient manner.
- ☐ Foster computer literacy for high school students.
- ☐ Promote success in further education and in the business world.
- ☐ Strengthen business and education partnerships and communication.

Objectives

- To encourage teachers, guidance counselors, and administrators to cooperatively use technology for effective instruction of basic skills.
- To provide students a focus for a career or course of study.
- To involve business, industry and labor representatives with teaching professionals in the development, implementation, articulation and evaluation of Technology Preparation curriculum.
- To increase the employability potential of students completing the Technology Preparation Program.
- To develop an understanding of the value of life long learning.

Curriculum

Columbus high schools offer a Tech Prep option for all students that is not confined to one subject area; but rather is a curriculum that students can take regardless of their career goals. The Tech Prep curriculum is not occupation specific, but instead emphasizes basic concepts students can adapt to future education or work.

A Futures Group, organized to identify emerging technologies in the region, specified Manufacturing Technologies, Health, Agriculture Technologies, and Business Technologies as those areas that will provide the largest growth in job clusters over the next five to ten years. During the 1989-90 pilot year, the Tech Prep curriculum focused on the core and electives in Manufacturing and Industrial Technologies. During the second year, the foundation in basic knowledge of math, English, and science was enhanced with Tech Prep classes related to Health and Business Technologies.

Within this framework, the Columbus prototype utilizes two approaches which were designed to meet the needs of both area vocational and comprehensive high schools and both large and small corporations.

Plan A - Tech Intensive is designed to serve either area vocational or comprehensive high schools. Students can travel to the Tech Prep site for a significant block of time to benefit from the equipment and teacher expertise of that school. In this plan students are enrolled in a core of Tech Prep courses.

Plan B - Tech Elective will serve a large student body or a smaller high school with limited funds or access to equipment. It starts slower, but could be expanded to a four year program. During the second year of the pilot there has been a blurring of the distinction between Plan A and Plan B.

The following is a listing of the first and second year curriculum:

First Year - Tech Intensive Core Courses

- Communications
- Integrated Algeotrig I
- Integrated Physics I
- Experiences in Technology

First Year - Tech Elective Courses

- Chemistry Technology
- Electro-Physics Tech

Second Year - Tech Intensive Core Courses

- Integrated Algeotrig II
- Integrated Physics II

Second Year - Tech Elective Courses

- Computer Power
- Manufacturing Technology
- Medical Biology

A number of the Tech Prep courses have been offered at the 10th grade level during the second year of the pilot. These courses include:

- Chem Tech
- Electro-Physics
- Integrated Algebra I
- Integrated Physics I
- Experiences in Technology (also available to 9th grade)
- Manufacturing Technology

Students

Student enrollment in Columbus Tech Prep classes was 53 at the conclusion of the 1989-90 school year. A variety of measures were used to recruit these students. All freshmen and sophomore students were given an overview of Tech Prep through study hall presentations and promotions. After working with the Math Department, the Project Manager visited all Pre-Algebra and Algebra 1-2 classes in the winter to encourage students to take Tech Prep. Objectives of the curriculum and proposed teaching methods were emphasized. Business leaders were recruited to accompany the Project Manager to share perspectives on technical education.

For year 2, parents of interested students attended an informational meeting presented by Tech Prep teachers, post secondary staff, and business representatives. Tech Prep course descriptions were included in the curriculum guides of Columbus East and North High Schools.

A special effort was made to recruit a broad mix of students. Males and females were encouraged to enter non-traditional technical fields. Those students who usually take only the required amount of math and science were recruited for Tech Prep; for they have been found to be mostly hesitant.

Approximately 50 students (25 at each high school) were enrolled in the Tech Intensive approach in year 2. Recruitment of these students was done primarily by the Project Manager in sophomore level math classes. Counselors, administrators, and teachers also encouraged appropriate students to take the Tech Intensive classes.

Enrollment in Tech Elective courses has expanded to approximately 70 students for year 2. Recruitment of these students was done by the classroom teachers and department chairs. Those teachers involved in Tech Prep classes went to the teachers of feeder classes in their area and asked for names of students who might be interested. Then the Project Manager, counselors and/or principals talked to each one individually. A total of approximately 200 students are enrolled in Tech Prep this year.

Faculty

Eleven teachers were involved in Tech Prep during the first pilot year. Tech Prep courses in the Columbus program are team taught by a technical and an academic teacher (with the exception of Chemistry Technology and Experiences in Technology). This number has expanded to 19 teachers during the second pilot year. An important quality of the Tech Prep teachers at Columbus is their willingness to change. All volunteered to write and teach the curriculum because they saw that not all students were being adequately served. Most of the teachers have worked in business and industry either through summer internships, summer jobs, or apprentice teaching positions. Knowledge of the workplace and contact with business representatives made them more credible to their students and much more amenable to Tech Prep teaching. All are experienced teachers who have pursued advanced education and training in their fields.

II. Compliance with State Guidelines

The following statements describe how Columbus High Schools are meeting the State Model Guidelines.

1. Target students in a general, unfocused program of studies

Project staff, guidance counselors, and administrators have targeted the needs of the middle ability students, disadvantaged students whose grades do not reflect their ability, and male and female students interested in non-traditional technologies areas. This is especially the case in the Tech Intensive courses. The overriding goal of such efforts is to permit the students opportunities to gain the competencies needed to succeed either at a post secondary program or in the workplace.

2. Involve local business, industry and labor

Local private sector representatives have been actively involved in the planning, delivery and evaluation of the curriculum primarily through three activities. The most significant is the Action Group which consists of 20-25 private sector representatives who advise on course content, publicity, and communication. Another significant activity is review of the curriculum by local business and industry and post secondary representatives. Private sector representatives (steering committee) also provide Tech Prep teachers with internships in their businesses.

3. Develop individual student plans of study

Although suggested Tech Prep course sequences do exist, individual student plans do not exist which reflect intended post high school goals and technical areas of interest.

4. Include articulation agreements between secondary and post secondary institutions

Although not an official articulation agreement, a memo of understanding has been executed between the Columbus schools and local post secondary institutions.

5. Incorporate a staff development process

Staff were afforded professional development opportunities during the first year and the inservice activities have been expanded upon during year two. More time has been spent on teaching methods, curriculum development, and instructional equipment use. Each staff member received additional prep time during his/her first year of tech prep teaching.

Additionally, participation in local regional and state wide meetings, workshops and conferences has been encouraged as are workplace internships.

III. Incorporation of State Model Features

The following statements describe the extent to which Bartholomew Consolidated School Corporation has incorporated the features of the State Model into the Tech Prep prototype.

1. A secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness taught through practical applications

The staff and administrators of Columbus high schools have developed a secondary school core curriculum of math, science and language arts. Computer literacy and career awareness competencies are integrated into all courses. Although not considered part of the core, Computer Power, Medical Biology, and Manufacturing Technology are offered as new technology electives. The distinguishing feature of all courses is application based instruction.

2. An articulated secondary-post secondary curriculum

Articulation arrangements have been completed. Discussions and memos of understanding have been executed with IVTC-Region 10, IUPUI at Columbus and the Purdue School of Technology. Post secondary personnel have also been included in the Design Team for each course. Preliminary agreements have been completed with Indiana State University, Ball State University and Vincennes.

3. Multiple entry points

With the expansion of Tech Prep into the 9th and 10th grades during 1990-91 multiple entry points are more evident.

4. Team teaching and/or joint instructional planning across areas of instruction

A team of teachers consisting of an academician and a technologist teach each course. Joint instructional planning is accomplished by conducting regular staff meetings and having common planning periods. Each teacher was given an extra planning period during the initial year of the pilot.

5. Teaching strategies which include application-based instruction, interdisciplinary instruction, and cooperative learning

Teaching strategies at both high schools, in all courses, include application-based instruction enhanced and somewhat assured via the team-teaching strategy employed.

6. Learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills

Included in the course guides are learning activities that emphasize problem-solving and critical thinking. Student group work is an integral part of the instruction designed to teach teamwork and cooperative skills.

7. Courses that are designed to promote mastery by being performance based

All courses promote mastery through performance based instruction. Methods used include team teaching, use of lab assistants, learning packets, computer software, peer tutoring, etc.

8. Core competencies delivered through specific courses or through integration across areas of instruction

Core competencies are delivered through specific courses and through integration across areas of instruction enhanced by team-teaching, block time scheduling, and interdisciplinary planning.

9. Locally determined recommendations for electives

Locally determined electives have been selected based on advice and consent of the Action Group and Steering Committee.

IV. Match with State Model Levels

This section describes the extent to which Bartholomew Consolidated School Corporation has incorporated the three levels as described in the State Tech Prep Curriculum Model diagram.

Tech Prep Core

The first level of the State Tech Prep Model is referred to as the Tech Prep Core Curriculum. Core competencies can be delivered through specific courses or through integration across areas of instruction. For the most part, this level of the model has been well-developed and is in place at Columbus.

Math - Demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies.

The Tech Prep core math competencies are taught in the following courses: Integrated Algebra I & II. The two year sequence consists of competencies in algebra, geometry and trigonometry. Probability and data analysis competencies are taught in Algebra I and II.

Science - Demonstrate first year biology and first year physical science, physics and chemistry, competencies.

The Tech Prep core science competencies are taught in the following courses. The four Tech Prep science courses include two years of physics, one year of biology as it relates to the Health Occupations and one year of Chemistry Technology. Only those in Tech Intensive programs take all core courses. The others are encourage to do the same but because they are not part of Tech Intensive, they would only have two required.

Language Arts - Demonstrate competencies reflecting four year of comprehensive English, including technical communication and technical literature competencies.

The Tech Prep core English, Language Arts competencies are taught in the following courses. A full year of communications is required as a part of the Tech Prep Core at Columbus East. At Columbus North only one semester is required. A senior Tech Prep English course is being developed at Columbus East due to student demand. Competencies in technical communications include reading, speaking, writing and research.

Computer Applications - Demonstrate basic competencies in keyboarding and computer applications.

Computer applications are integrated throughout all courses and a specific course, Computer Power, is offered as an elective.

Introduction to Careers - Demonstrate an awareness of careers and an ability to examine current and evolving technical careers.

Career information is provided through several avenues including speakers in class and business and industry tours in most of the Tech Prep Courses, guidance counselors, career fairs, etc. A single course does not exist for introducing students to careers.

Economics - Demonstrate competencies in applying economic principles.

A single course does not exist, although economic principles are integrated into the experiences in Technology and Computer Power Courses. Economic principles are also provided to students by guest speakers and business and industry tours.

Specialized Tech Prep Curriculum

The second level of the State Tech Prep Model is referred to as "Specialized Tech Prep Curriculum" and consists of 3 to 5 courses related to the technical area of preparation. Columbus has courses in Business, Health and Manufacturing in the Tech Prep Elective plan and has identified vocational courses that can be elected by students pursuing a technological career.

Post Secondary Articulation

The third level of the State Tech Prep Model is "Articulation with Post Secondary Institutions." Articulation efforts have been pursued and agreements are in place with several surrounding post secondary institutions including IVTC, IUPUI at Columbus and Purdue School of Technology.

V. Conclusion

In summary, the Tech Prep prototype piloted at Columbus North and East High Schools is in compliance with almost all state guidelines and incorporates most of the features of the state model. All levels of the state model are in place. Progress is being made to expand the Tech Prep curriculum to additional students in the future.

Cross Site Summary

This section of the report is designed to provide an overall comparison and summary of how the five pilot sites align with the state model for Tech Prep. More specifically, the comparison shows how and the extent to which the prototypes are in compliance with state guidelines, incorporate the features of the state model, and match the levels depicted in the state model.

Compliance with State Guidelines

1.Target students in a general, unfocused program of studies.

Bloomington	Yes (based on course rather than student selection)
Columbus	Yes (especially so for Tech Intensive plan)
Ben Davis	Yes (non college prep, middle 50%, interested in technical careers)
North Montgomery	Yes (unfocused secondary program)
Mishawaka	Yes (unfocused secondary program)

2.Involve local business, industry and labor

Bloomington	Yes (mostly involved in staff development)
Columbus	Yes (extensive involvement)
Ben Davis	Yes (extensive involvement)
North Montgomery	Yes (involvement is increasing steadily)
Mishawaka	Yes (extensive involvement)

3.Develop individual student plans of study

Bloomington	No (discussion stage only)
Columbus	No (tech prep course sequences only)
Ben Davis	Yes (based on interests, goals, and abilities)
North Montgomery	Yes (required of all students in school)
Mishawaka	Yes (required of all students in school)

4.Include articulation agreements between secondary and postsecondary institutions

Bloomington	No (just beginning process)
Columbus	Yes (3 established; 3 in discussion stage)
Ben Davis	Yes (1 established; 3 in discussion stage)
North Montgomery	No (initial efforts begun; 1 draft under review)
Mishawaka	Yes (1 established; 2 in discussion stage)

5.Incorporate a staff development process

Bloomington	Yes (extensive process in place)
Columbus	Yes (extensive process in place)
Ben Davis	Yes (extensive process in place)
North Montgomery	Yes (process in place now after slow start)
Mishawaka	Yes (extensive process in place)

Incorporation of State Model Features

1.A secondary school core of competencies in mathematics, science, English/language arts, economics, computer literacy, and career awareness taught through practical applications

Mathematics

Bloomington	Yes
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes
Mishawaka	Yes

Science

Bloomington	Yes
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes (beginning in 1991-1992)
Mishawaka	Yes

English/Language Arts

Bloomington	Yes
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes
Mishawaka	Yes

Economics

Bloomington	Many economic principles provided in courses
Columbus	Many economic principles provided in courses
Ben Davis	Many economic principles provided in courses
North Montgomery	Have developed an Economics Tech Prep course
Mishawaka	Working on integrating into courses

Computer Literacy

Bloomington	Yes (integrated into courses and offer course)
Columbus	Yes (integrated into courses and offer course)
Ben Davis	Yes (course developed for 1991-1992)
North Montgomery	Yes (course)
Mishawaka	Yes (course)

Career Awareness

Bloomington	Yes (included in core courses)
Columbus	Yes (included in core courses)
Ben Davis	Yes (offer course)
North Montgomery	Yes (included in core courses)
Mishawaka	Yes (included in core courses)

2. An articulated secondary-postsecondary curriculum

Bloomington	No (just beginning process)
Columbus	Yes (3 established; 3 in discussion stage)
Ben Davis	Yes (1 established; 3 in discussion stage)
North Montgomery	No (initial efforts begun; 1 draft under review)
Mishawaka	Yes (1 established; 2 in discussion stage)

3. Multiple entry points

Bloomington	grades 9 or 10
Columbus	grades 9,10, or 11
Ben Davis	grades 11 and 12 (10th grade in 1991-92)
North Montgomery	grades 11 and 12 (9th and 10th grade in 1991-92)
Mishawaka	each semester of all 4 years

4. Team teaching and/or joint instructional planning across areas of instruction

Bloomington	Joint instructional planning but no team teaching
Columbus	Joint instructional planning and team teaching
Ben Davis	Joint instructional planning and team teaching
North Montgomery	Nonscheduled and informal
Mishawaka	Joint instructional planning but no team teaching

5. Teaching strategies which include application-based instruction, interdisciplinary instruction, and cooperative learning

Bloomington	Yes
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes
Mishawaka	Yes

6. Learning activities which emphasize problem solving, critical thinking skills, teamwork, and cooperative learning skills

Bloomington	Yes
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes
Mishawaka	Yes

7. Courses that are designed to promote mastery by being performance based

Bloomington	Yes (but not implemented yet)
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes
Mishawaka	Yes

8. Core competencies delivered through specific courses or through integration across areas of instruction

Bloomington	Some integration but mostly in specific courses
Columbus	Both integration and specific courses
Ben Davis	Primarily through specific courses; some integration
North Montgomery	Both integration and specific courses
Mishawaka	Primarily through specific courses; some integration

9. Locally determined recommendations for electives

Bloomington	Yes
Columbus	Yes
Ben Davis	Yes
North Montgomery	Yes
Mishawaka	Yes

Match with State Model Levels

Tech Prep Core

The first level of the state model (Tech Prep Core) is well established at each site. Refer to Question 1 under the Incorporation of State Model Features section above for details.

Specialized Tech Prep Curriculum

The second level of the State Tech Prep Model is referred to as Specialized Tech Prep Curriculum and consists of 3-5 courses related to the technical area of preparation.

Bloomington	Not fully developed; vocational courses not modified to reflect Tech Prep concepts
Columbus	Yes (Business, Health, and Manufacturing)
Ben Davis	Initially selected Electronics and Heating and Air Conditioning but not fully developed
North Montgomery	Yes (2 sequences in Business and 1 in Manufacturing)
Mishawaka	Yes (Health and Engineering/Manufacturing Tech)

Post Secondary Articulation

The third level of the State Tech Prep model is Articulation with Postsecondary institutions.

Bloomington	No (just beginning process)
Columbus	Yes (3 established; 3 in discussion stage)
Ben Davis	Yes (1 established; 3 in discussion stage)
North Montgomery	No (initial efforts begun; 1 draft under review)
Mishawaka	Yes (1 established; 2 in discussion stage)

SECTION II

Summary of Student Gains

Introduction

The implementation of a new curricular effort such as Tech Prep always raises questions regarding outcomes. Questions regarding effectiveness are common. This aspect of the evaluation sought to establish a baseline from which gains could be measured. Additionally, it included a parallel control group that could be used in a comparison with the traditional program. Even though posttest scores were collected and analyzed, it was stated at the beginning of the evaluation that the true comparisons would be made after two, three and four years. This fact is due in part to the sensitivity of measuring instruments and the normal expectation of educational innovations.

Sample

The sample for this aspect of the evaluation included the Tech Prep students from each of the five sites. Additionally, a comparable control group was selected at each site. Since randomization was impossible in the selection of either group (an occurrence common to almost all experimental inquiry in educational settings) the statistical technique called Analysis of Covariance (ANOCOVA) was used. This technique makes statistical adjustments in posttest scores based on differences that are identified among groups on pretest scores. Essentially, ANOCOVA equates groups that are initially different.

In the case of all sites, a class of students was selected as the control group. This class was selected as representing students in the general education curriculum who were judged to have similar capabilities as the Tech Prep group. In most cases, this group was a class of Introductory Algebra students.

Instruments

This part of the study relied on both existing performance data and on newly collected information. Achievement test results, absentee rates, and grade point average were acquired from student files. Career maturity and attitude toward a variety of education and technology related issues were assessed through the administration of two instruments. The Career Maturity Inventory, Attitude Scale was used to measure Career Maturity. A specially designed, instrument was used to measure student attitudes. The following factors were included in the attitude instrument (Student Reaction Form): attitude toward teachers, attitude toward courses, attitude toward school, attitude toward schedule, attitude toward further education, attitude toward technological careers, and attitude toward technology. For the 1991 administration of the instrument, three components were added that focussed on socio-technical skills. These included: problem solving, team work, and critical thinking. The appendix includes a sample of each instrument.

Procedure

During the last week of September and the first week of October, the Career Maturity Inventory and the Student Reaction Form were administered to the Tech Prep students at

each site. Data were extracted from student files regarding achievement, absenteeism and grade point averages.

The same data were collected at the close of the school year in late May of 1991. Additionally, data were collected from the Tech Prep group involved in 1989-90 and the control group of the same year.

Data Analysis Procedures

One group of student data were collected in fall of 1989, in fall of 1990, and again in the spring of 1991. Another group of student data were collected in the fall of 1990 and again in the spring of 1991. Frequencies were determined for student gender. Mean scores were calculated for achievement, days absent, grade point average, career maturity, and the 10 attitude subscales.

The tables present comparisons of Tech Prep and control group means from the 1991 posttest data. Student achievement scores (California Achievement Test or ISTEP) and pretest measurements of days absent, GPA, career maturity, and student attitude were used to statistically equalize the Tech Prep and control groups via Analysis of Covariance. The statistical significance of the differences in the means was tested at the .05 level.

The tables present one of two comparisons, or both: 1991 posttest comparisons adjusted for 1989 pretest scores, or 1991 posttest comparisons adjusted for 1990 pretest scores. Both comparisons are presented for Bloomington North, Bloomington South, Ben Davis, North Montgomery, Mishawaka, Columbus North Chem Tech, and Columbus East Electro Physics.. 1990-91 comparisons only are presented for Columbus East English, Computer Power, and Medical Biology; and for Columbus North Manufacturing Technology, Experiences in Technology, and AlGeoTrig, . 1989-91 comparisons only are presented for Columbus North Tech Intensive.

Results

The tables presented on the following pages include mean scores and standard deviation for both control and Tech Prep groups at each site. An asterisk is placed next to those posttest means that were significantly different between the Tech Prep and Control Group using Analysis of Covariance. A footnote is included that describes each difference.

It should be noted that posttest scores were not obtained for achievement in math, reading and language.

**Data Summary for Bloomington South High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n = 18) MEAN SCORES Posttest	Control Group (n = 22) MEAN SCORES Posttest
# Days Absent 1990-91	7.13	8.50
Grade Point Average (end of 1990-91)	2.19	2.51
Career Maturity	51.15	51.30
Attitude Toward:		
Teachers	62.29	65.20
Courses	69.14*	62.20*
School(Gen.)	55.85	56.70
Schedule	53.57	49.50
Further Ed.	79.29	75.70
Technological Careers	59.43	59.80
Technology	58.35	61.80
Problem Solving	67.42	66.80
Teamwork	63.57	65.50
Questioning	76.00*	83.30*

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Bloomington North High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n = 26) MEAN SCORES Posttest	Control Group (n = 26) MEAN SCORES Posttest
# Days Absent 1990-91	6.43	7.43
Grade Point Average (end of 1990-91)	2.22	2.26
Career Maturity	49.63	48.94
Attitude Toward:		
Teachers	60.72	60.27
Courses	65.27	62.72
School(Gen.)	52.68	52.16
Schedule	47.95	48.61
Further Ed.	75.64	73.11
Technological Careers	60.45	57.89
Technology	58.27	63.17
Problem Solving	68.68	66.00
Teamwork	65.68	68.33
Questioning	81.77	80.61

**Data Summary for Bloomington South High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 57) MEAN SCORES Posttest	Control Group (n = 22) MEAN SCORES Posttest
# Days Absent 1990-91	10.66	8.50
Grade Point Average (end of 1990-91)	2.22	2.51
Career Maturity	51.19	51.30
Attitude Toward:		
Teachers	61.73	65.20
Courses	66.46	62.20
School(Gen.)	70.61*	56.70*
Schedule	55.19	49.50
Further Ed.	73.50	75.70
Technological Careers	69.04*	59.80*
Technology	72.50*	61.80*
Problem Solving	72.15	66.80
Teamwork	70.38	65.50
Questioning	82.19	83.30

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Bloomington North High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 52) MEAN SCORES Posttest	Control Group (n = 26) MEAN SCORES Posttest
# Days Absent 1990-91	9.35	7.43
Grade Point Average (end of 1990-91)	2.06	2.26
Career Maturity	44.45	48.94
Attitude Toward:		
Teachers	59.58	60.27
Courses	63.10	62.72
School(Gen.)	63.86*	52.16*
Schedule	50.69	48.61
Further Ed.	67.41	73.11
Technological Careers	64.34*	57.89*
Technology	67.14	63.17
Problem Solving	63.03	66.00
Teamwork	68.79	68.33
Questioning	75.90	80.61

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for North Montgomery High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n = 29) MEAN SCORES Posttest	Control Group (n = 28) MEAN SCORES Posttest
# Days Absent 1990-91	8.78	7.59
Grade Point Average (end of 1990-91)	2.30*	2.71*
Career Maturity	51.38	49.04
Attitude Toward:		
Teachers	61.43	59.30
Courses	62.64	64.87
School(Gen.)	49.85*	49.26*
Schedule	43.57	46.96
Further Ed.	80.43	73.09
Technological Careers	61.71	59.78
Technology	57.50	60.30
Problem Solving	69.14	69.04
Teamwork	66.79*	71.52*
Questioning	80.29	82.52

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for North Montgomery High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 44) MEAN SCORES Posttest	Control Group (n = 28) MEAN SCORES Posttest
# Days Absent 1990-91	9.93	7.59
Grade Point Average (end of 1990-91)	2.08*	2.71*
Career Maturity	42.48	49.04*
Attitude Toward:		
Teachers	70.00*	59.30*
Courses	69.65	64.87
School(Gen.)	69.26*	49.26*
Schedule	54.78	46.96
Further Ed.	69.34	73.09
Technological Careers	62.83	59.78
Technology	67.43*	60.30*
Problem Solving	75.91*	69.04*
Teamwork	64.13*	71.52*
Questioning	81.30	82.52

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Ben Davis High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n = 18) MEAN SCORES Posttest	Control Group (n = 16) MEAN SCORES Posttest
# Days Absent 1990-91	11.82	19.58
Grade Point Average (end of 1990-91)	2.16*	1.78*
Career Maturity	46.86*	38.50*
Attitude Toward:		
Teachers	61.14*	57.20*
Courses	68.43	62.80
School(Gen.)	52.14	50.50
Schedule	37.14	44.00
Further Ed.	84.71*	76.70*
Technological Careers	61.14	59.20
Technology	56.71	59.00
Problem Solving	65.14	62.60
Teamwork	63.57	63.50
Questioning	81.71*	76.40*

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Ben Davis High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 23) MEAN SCORES Posttest	Control Group (n = 16) MEAN SCORES Posttest
# Days Absent 1990-91	12.26	19.58
Grade Point Average (end of 1990-91)	2.07	1.78
Career Maturity	38.90	38.50
Attitude Toward:		
Teachers	68.15*	57.20*
Courses	70.05	62.80
School(Gen.)	70.25*	50.50*
Schedule	50.75*	44.00*
Further Ed.	71.95	76.70
Technological Careers	74.95*	59.20*
Technology	75.80*	59.00*
Problem Solving	71.60*	62.60*
Teamwork	68.20	63.50
Questioning	80.50	76.40

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Mishawaka High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n=9) MEAN SCORES Posttest	Control Group (n=7) MEAN SCORES Posttest
# Days Absent 1990-91	6.55	7.43
Grade Point Average (end of 1990-91)	2.25	2.29
Career Maturity	47.44	47.00
Attitude Toward:		
Teachers	62.67	62.14
Courses	68.11	67.14
School(Gen.)	51.56	52.29
Schedule	48.33	52.86
Further Ed.	81.56	71.00
Technological Careers	62.22	62.00
Technology	56.67*	62.00*
Problem Solving	65.22	63.43
Teamwork	66.67	67.57
Questioning	80.44*	75.14*

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Mishawaka High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n=51) MEAN SCORES Posttest	Control Group (n=7) MEAN SCORES Posttest
# Days Absent 1990-91	5.42	7.43
Grade Point Average (end of 1990-91)	2.41	2.29
Career Maturity	45.71	47.00
Attitude Toward:		
Teachers	68.55*	62.14*
Courses	68.35	67.14
School(Gen.)	72.60*	52.29*
Schedule	52.91	52.86
Further Ed.	77.53	71.00
Technological Careers	72.30	62.00
Technology	71.98	62.00
Problem Solving	73.65*	63.43*
Teamwork	72.67	67.57
Questioning	82.86	75.14

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Tech Prep Intensive: Columbus North High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n = 16) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	10.71	11.85
Grade Point Average (end of 1990-91)	5.59	5.97
Career Maturity	53.33	50.44
Attitude Toward:		
Teachers	57.58	62.00
Courses	64.75	61.63
School(Gen.)	52.50	53.50
Schedule	46.08	40.00
Further Ed.	76.08	73.75
Technological Careers	60.67	61.63
Technology	59.67	61.75
Problem Solving	68.33	65.00
Teamwork	71.82	70.63
Questioning	86.45	90.63

**Data Summary for Electro/Physics at Columbus East High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group (n = 9) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	10.38	11.85
Grade Point Average (end of 1990-91)	7.35*	5.97*
Career Maturity	47.60	50.44
Attitude Toward:		
Teachers	60.00	62.00
Courses	60.00	61.63
School(Gen.)	56.40	53.50
Schedule	51.00	40.00
Further Ed.	73.40	73.75
Technological Careers	60.00	61.63
Technology	60.00	61.75
Problem Solving	67.20	65.00
Teamwork	64.00	70.63
Questioning	76.00	90.63

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Chem Tech at Columbus North High School
(Using 1989 Pretest Scores as Covariates)**

	Tech Prep Group** (n=21) MEAN SCORES Posttest	Control Group (n=15) MEAN SCORES Posttest
# Days Absent 1990-91	8.68	11.85
Grade Point Average (end of 1990-91)	4.88	5.97
Career Maturity	52.00	50.44
Attitude Toward:		
Teachers	61.33	62.00
Courses	60.33	61.63
School(Gen.)	53.00	53.50
Schedule	43.33	40.00
Further Ed.	81.00	73.75
Technological Careers	58.67	61.63
Technology	63.00	61.75
Problem Solving	69.33	65.00
Teamwork	72.50*	70.63*
Questioning	80.00*	90.63*

**All Tech Prep posttest data is based on 3 returned complete cases

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for AlGeo Trig at Columbus North High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 12) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	13.30	11.85
Grade Point Average (end of 1990-91)	4.61*	5.97*
Career Maturity	48.25	50.44
Attitude Toward:		
Teachers	63.22	62.00
Courses	63.67	61.63
School(Gen.)	67.22	53.50
Schedule	52.22	40.00
Further Ed.	68.89	73.75
Technological Careers	65.78	61.63
Technology	69.00	61.75
Problem Solving	75.56*	65.00*
Teamwork	71.11	70.63
Questioning	84.89	90.63

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Experiences in Technology
at Columbus North High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 12) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	11.50	11.85
Grade Point Average (end of 1990-91)	4.84*	5.97*
**Career Maturity	48.50	50.44
Attitude Toward:		
Teachers	73.00	62.00
Courses	69.00*	61.63*
School(Gen.)	70.00	53.50
Schedule	50.00	40.00
Further Ed.	75.00	73.75
Technological Careers	76.50	61.63
Technology	84.00*	61.75*
Problem Solving	80.00*	65.00*
Teamwork	84.50	70.63
Questioning	83.50	90.63

**CMI and subscale posttest scores are based on 2 cases

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Manufacturing Technology
at Columbus North High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 15) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	18.93	11.85
Grade Point Average (end of 1990-91)	4.95	5.97
Career Maturity	39.33	50.44
Attitude Toward:		
Teachers	57.00	62.00
Courses	62.60	61.63
School(Gen.)	55.80	53.50
Schedule	46.80	40.00
Further Ed.	56.30	73.75
Technological Careers	68.90	61.63
Technology	64.10	61.75
Problem Solving	70.25	65.00
Teamwork	56.25	70.63
Questioning	78.25	90.63

**Data Summary for Chem Tech at Columbus North High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 22) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	10.71	11.85
Grade Point Average (end of 1990-91)	5.49	5.97
Career Maturity	52.94	50.44
Attitude Toward:		
Teachers	72.28*	62.00*
Courses	66.72	61.63
School(Gen.)	74.55*	53.50*
Schedule	60.83*	40.00*
Further Ed.	70.67	73.75
Technological Careers	70.33*	61.63*
Technology	75.44*	61.75*
Problem Solving	76.00*	65.00*
Teamwork	78.33	70.63
Questioning	86.67	90.63

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Computer Power at Columbus East High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 10) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	19.11	11.85
Grade Point Average (end of 1990-91)	5.49	5.97
Career Maturity	40.00	50.44
Attitude Toward:		
Teachers	75.00*	62.00*
Courses	63.25	61.63
School(Gen.)	78.50*	53.50*
Schedule	58.75*	40.00*
Further Ed.	80.75	73.75
Technological Careers	74.50*	61.63*
Technology	73.75	61.75
Problem Solving	78.00	65.00
Teamwork	68.75	70.63
Questioning	81.25*	90.63*

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Medical Biology at Columbus East High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 15) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	16.67	11.85
Grade Point Average (end of 1990-91)	5.52	5.97
Career Maturity	48.31	50.44
Attitude Toward:		
Teachers	71.46	62.00
Courses	64.54	61.63
School(Gen.)	77.62*	53.50*
Schedule	56.92*	40.00*
Further Ed.	71.23	73.75
Technological Careers	68.85*	61.63*
Technology	73.77*	61.75*
Problem Solving	72.38	65.00
Teamwork	69.76	70.63
Questioning	71.62*	90.63*

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for Electro/Physics at Columbus East High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 12) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	11.08	11.85
Grade Point Average (end of 1990-91)	4.34*	5.97*
Career Maturity	48.50	50.44
Attitude Toward:		
Teachers	63.50	62.00
Courses	62.08	61.63
School(Gen.)	65.58*	53.50*
Schedule	56.25*	40.00*
Further Ed.	72.58	73.75
Technological Careers	73.33	61.63
Technology	74.92*	61.75*
Problem Solving	68.30	65.00
Teamwork	67.50	70.63
Questioning	73.30	90.63

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

**Data Summary for English at Columbus East High School
(Using 1990 Pretest Scores as Covariates)**

	Tech Prep Group (n = 22) MEAN SCORES Posttest	Control Group (n = 15) MEAN SCORES Posttest
# Days Absent 1990-91	17.07	11.85
Grade Point Average (end of 1990-91)	4.96	5.97
Career Maturity	47.67	50.44
Attitude Toward:		
Teachers	75.17*	62.00*
Courses	69.17*	61.63*
School(Gen.)	74.08*	53.50*
Schedule	55.00*	40.00*
Further Ed.	76.67	73.75
Technological Careers	80.42*	61.63*
Technology	75.33*	61.75*
Problem Solving	77.58*	65.00*
Teamwork	79.08	70.63
Questioning	84.75	90.63

* Indicates significant differences between the two means at the .05 level using Analysis of Covariance

Summary Statements

Bloomington South

- In general, participation in Tech Prep appears to have had a more positive effect on the attitudes of the 1990-91 students than on the 1989-91 group.
- In all other areas measured, the groups remained roughly equivalent.

Bloomington North

- The only statistically significant differences between the two groups were in the areas of "attitude toward school in general" and "attitude toward technological careers" in which the 1990-91 Tech Prep group scored higher.

North Montgomery

- In general, participation in Tech Prep appears to have had a more positive effect on the attitudes of the 1990-91 students than on the 1989-91 group.
- Tech prep students in the 1990-91 group are more positive about many aspects of their experience than are control group students.
- In the area of academic achievement, the control group had a significant advantage in the beginning and maintained that difference throughout (as measured by pretest achievement test scores and grade point averages).

Ben Davis

- In general, participation in Tech Prep appears to have had a more positive effect on the attitudes of the 1990-91 students than on the 1989-91 group.
- Tech prep students in the 1990-91 group are more positive about many aspects of their experience than are control group students.

Mishawaka

- The Tech Prep group displayed significant advantages in attitude score for many program areas.

Columbus North

- The only major differences observed were in student attitude of the 1990-91 Chem Tech students. The tech prep group scored significantly higher in many attitude areas than the control group.

Columbus East

- Major differences observed between Tech Prep and control groups were in student attitude, where the Tech Prep groups scored significantly higher in many areas.

SECTION III

SURVEY OF POST SECONDARY PERSONNEL

Purpose of the Survey

The purpose of this survey was to assess how post secondary personnel view the (Indiana) state proposed Technology Preparation Curriculum. The evaluation focused on the perceptions of post secondary education personnel related to the Technology Preparation Curriculum in three areas: (1) awareness of the curriculum, (2) importance of the curriculum features, and (3) relevance of the overall curriculum content.

Key Evaluation Questions

The following questions have been formulated to guide the evaluation and to meet the information needs of the Indiana State Board of Education and the five pilot site management teams:

1. How aware of the secondary Tech Prep curriculum are post secondary personnel?
2. How important do post secondary personnel feel the Tech Prep features and goals are?
3. How relevant do post secondary personnel feel the general and specialized curriculum content is in regards to their instructional program areas?

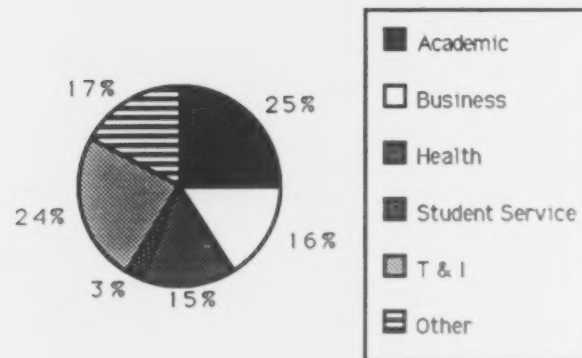
Sample

The sample for this survey was randomly selected from lists of post secondary personnel provided by the project managers at each of the five pilot test sites. Out of the 134 instruments mailed, 78 were returned. Personnel from a total of 10 major post secondary institutions comprised the base of this sample group (See Table 1). Although a majority of the respondents were school administrators (67%), academic instructors (33%) were well represented in the responding group. The responding sample also consisted of academic personnel from several different academic program areas (See Figure 1). However, only 81% of the responding group provided this information.

Table 1. Percentage Breakdown of the Sample by Post Secondary Institution.

Institution	Percentage
Indiana State University	3%
Indiana University	6%
IUPUI	5%
IVY Tech - Bloomington	21%
IVY Tech - Columbus	18%
IVY Tech - Indianapolis	8%
IVY Tech - Lafayette	6%
IVY Tech - South Bend	21%
Purdue University	3%
Vincennes University	6%
Other	3%

Figure 1 Percentage Breakdown of the Sample by Program Area.



Instrument

A survey instrument (see the appendix) was developed around the three key questions stated above. Each question was investigated through several corresponding items. The result was an eight item questionnaire titled the *Tech Prep Information Survey*. In addition, the instrument contained several paragraphs of background information. This information was included in order to give respondents who had not heard of Tech Prep the minimum knowledge necessary to complete the survey.

The first question, dealing with *awareness of the curriculum*, was investigated through two items. One item inquired as to whether the respondents had previously heard of Tech Prep and if so, how they heard about it. The other item explored the awareness of respondents by inquiring about their involvement with Tech Prep.

The second question, dealing with *importance of goals and features*, was investigated by an item consisting of a list of 15 goals and features of the Tech Prep curriculum. This item required respondents to rate the educational importance of each goal/feature on a 4 point scale that ranged from *Not Very Important* to *Very Important*.

The third question, dealing with *content relevance*, was investigated through several items. Two items were concerned with the core curriculum content, and one item dealt with the specialized curriculum content. The first item in this area consisted of a list of 12 core competencies that Tech Prep students should acquire as a result of completing the program. Respondents were asked to rate the relevance of each competency (in regards to their program areas) on a 4 point that ranged from *Not Very Relevant* to *Very Relevant*. Another item was open-ended and gave respondents the opportunity to list any additional core competencies which they deemed relevant to their instructional program areas. In regards to the specialized curriculum content, respondents were asked to rate the

appropriateness of vocational specialization in three distinct settings (high school, post high school, and the work place) on a 4 point scale ranging from *Not Very Appropriate* to *Very Appropriate*.

Finally, the survey concluded with an item requesting personal information (title, instructional program area, and institutional enrollment), and an open-ended item asking respondents to indicate any additional concerns and provide general comments.

Procedure

School personnel from local post secondary institutions in the vicinity of all five pilot test sites were sent a mail survey instrument, and a cover letter explaining the state mandate for Tech Prep. The instrument was distributed to administrator and faculty mailboxes between May 6 and May 13 of 1991. Respondents completed the survey form and dropped it in the mail. All instruments were mailed directly to Evaluation Consultants.

Results

All responses were coded and entered into Microstat, a microcomputer based statistical program. The entered data were summarized using descriptive statistics and frequency counts. The following figures and tables present a summary of responses to each item.

Figure 2. Responses to Item 1.

Have you heard about Tech Prep before receiving this survey form?

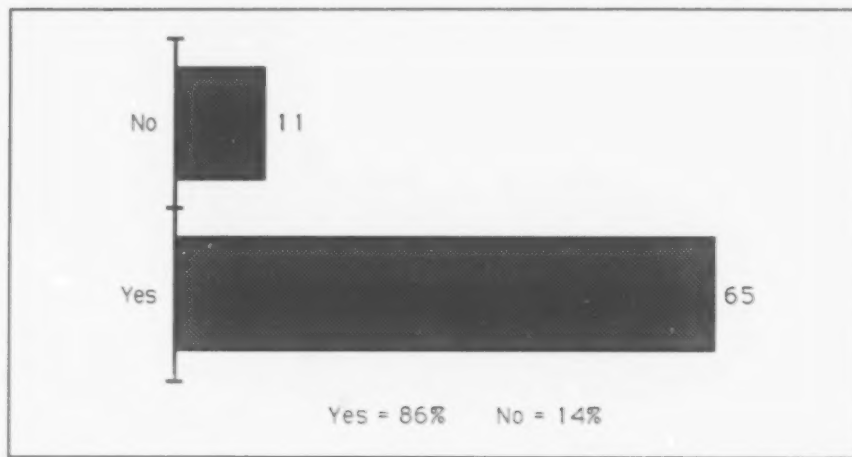


Table 2. Responses to Item 1.

If yes, how did you hear about it?

Students	3
School Personnel	45
Local Media	17
Business/Civic Org.	5
Other	23

Representative and Dominant Responses to "Other":

- Indiana State Government Officials & corresponding legislation
- Direct Involvement: Part of Tech Prep Committee or Task Force
- Educational Journals
- University Faculty

Figure 3. Responses to Item 2.

Have you or others in your institution been involved with Tech Prep?

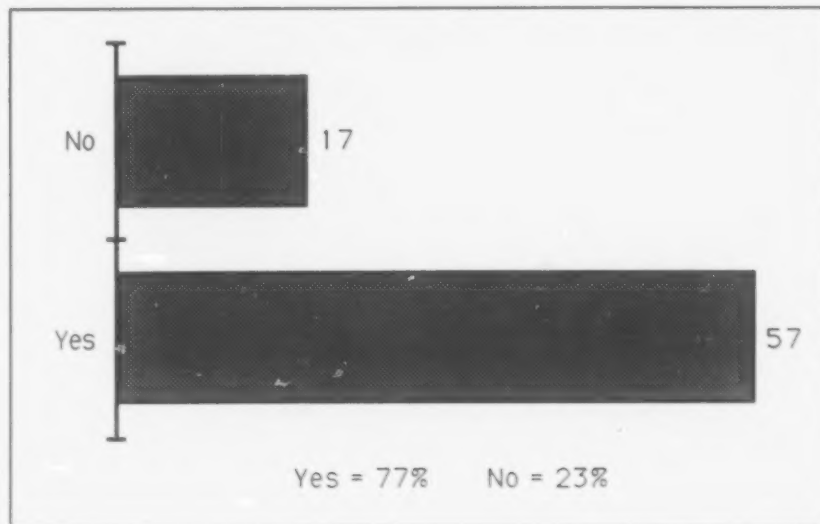


Table 3. Responses to Item 3.

Please rate the importance of the following Tech Prep purposes and features:

	Not Very Important 1	2	3	Very Important 4		
					Mean	Standard Deviation
a. Prepare students to live and work in a highly technical world					3.78	.50
b. Increase the number of high school graduates prepared for entry into technical occupations					3.51	.64
c. Increase the number of Indiana high school graduates who continue their education in a post secondary institution					3.63	.54
d. Integrate real life applications with academic subjects so students see meaning and relationships for what they are learning					3.67	.58
e. Provide a curriculum that encourages either a smooth transition from high school to employment or post secondary education programs					3.63	.56

f. Be based on individual student plan of study according to post secondary goals	3.00	.76
g. Teach through work place applications	3.08	.81
h. Require articulation between secondary and post secondary programs	3.23	.76
i. Involve post secondary instructional personnel in the planning and evaluation of the curriculum	3.54	.63
j. Incorporate staff development processes	3.48	.62
k. Allow for multiple entry points	3.17	.70
l. Base student mastery on performance	3.43	.64
m. Integrate core competencies across areas of instruction	3.42	.66
n. Emphasize skills such as problem solving, critical thinking, teamwork, and cooperation	3.77	.43
o. Serve those students now in a general, unfocused high school program of studies	3.43	.73

Table 4. Responses to Item 4.

Please rate the relevance of the following core competencies for your instructional program area:

	Not Very Relevant 1	2	3	Very Relevant 4		
					Mean	Standard Deviation
a. First year algebra competencies					3.31	.93
b. First year geometry competencies					2.75	1.10
c. Probability & data analysis competencies					2.71	.87
d. First year biology competencies					2.41	1.10
e. First year physical science competencies					3.00	.94
f. Competencies learned in four year comprehensive English					3.57	.66

g. Technical communication competencies	3.45	.71
h. Technical literature competencies	3.07	.83
i. Basic keyboarding competencies	3.30	.76
j. Basic computer application competencies	3.32	.76
k. Competencies in examining current and evolving technical careers	2.99	.76
l. Competencies in applying economic principles	2.92	.81

Table 5. Responses to Item 5.

Please list any other core competencies which you feel should be included in the secondary school component of the Tech Prep program based on the needs in your instructional program area.

Representative and Dominant Responses:

- Basic and intermediate writing skills
- Problem solving
- Trigonometry
- Verbal communication
- •Interpersonal skills
- •Business Math
- •Math

Table 6. Responses to Item 6.

Please rate the appropriateness of teaching specialized technical knowledge in the following settings:

	Not Very Appropriate			Very Appropriate	
	1	2	3	4	
				Mean	Standard Deviation
a. High School				2.80	.91
b. Post High School				3.84	.40
c. Employer Conducted Training				3.36	.80

Table 7. Responses to Item 8.

Please use this space to express any additional comments or concerns regarding Tech Prep:

- "Tech Prep legislation is a real plus for Indiana high school students. I sincerely hope it is a success."
- "Training students in group process, flexible thinking, problem solving, and communication skills are the most important features of Tech Prep ... I hope teachers and administrators of Tech Prep programs do not let their own energy and innovation become swallowed up in the traditions of schooling so that high school students continue to be isolated from the community and the work community."
- "Tech Prep is like any other endeavor, if people are not hired who have the real world plus book knowledge of the area, results will be modest at best. Too many public school employees cannot relate school to the real world because they have only done one thing in their life - be involved in public school education."
- "It is essentially impossible to meet the goals of the program with the present generation of teachers. The only hope is that future generations will be better."
- "Reading, writing, speaking, listening, and computing are nearly always joined to solve multi-step problems in the work place. These sometimes take several days to solve. Tech Prep needs to provide such experiences which may mean breaking down departmental lines more than I've seen so far."
- "I am very impressed with the programs and results I have seen from Tech Prep. I am very concerned about the importance that our Indiana Legislature places on the program and hope they will not scuttle such an improvement in our educational system."
- "The system is such a political driven system that both the curriculum and students are pawns in a power move by IVTC and the IDOE."
- "Tech Prep will fail if: (1) there is not some standards set in the technology area, (2) this program focuses only on vocational students in high school, and (3) the local community believes this program is a vocational program."
- "As strong as state support for Tech Prep is at this time, it is still far too limited. Without a major increase in teacher in-service funds, most changes will be superficial and goals will never be met."
- "Tech Prep can involve businesses, but only to find out skills needed, it shouldn't become a feeder to train for specific industries."
- "Public awareness and support is crucial to the success of Tech Prep."
- "It is very important that the Tech Prep curriculum open possibilities both for employment and post secondary education. Life is too complicated these days to think that a 15 year old can predict a life-long area of employment."

Summary Statements

- An overwhelming majority of post secondary educators are both aware of and involved with Tech Prep. Although many of these educators became aware of the program through school personnel (administrators and instructors), many were exposed to Tech Prep through government officials and the mandated legislation, and direct involvement with Tech Prep.
- There is strong support for a majority of the Tech Prep goals/features. However post secondary educators feel the most important aspects of the curriculum are *to prepare students to live and work in the present/future technical environment, to integrate academic knowledge with real life application, and to teach students technical and interpersonal skills such as problem solving, critical thinking, teamwork, and cooperation*. According to these educators' ratings, the emphasis of education should be on teaching students how to deal effectively with the realities of their environment, both in the community and the work place.
- There is strong support, but less agreement, on the importance of the following Tech Prep goals/features: *Base student curriculum on post secondary goals, teach through work place applications, and allow for multiple entry points*.
- There are mixed reactions to the general relevance of the proposed competencies provided by the Tech Prep core curriculum content. *English, technical communication, and basic computer applications* are deemed to be the most relevant competencies. However, competencies in *biology, geometry, and data analysis* are not viewed as being as pertinent.
- There seems to be some post secondary support for the development of competencies such as *basic and intermediate writing skills, problem solving skills, trigonometry, and verbal communication*.
- Post secondary educators, in general, feel that the most appropriate place for teaching specialized technical knowledge is the post high school institution (IVY tech, 4 year university, etc.), and that high school is the least appropriate setting for technical specialization.
- Many post secondary educators view Tech Prep in a positive manner, and feel it is an improvement in Indiana's educational system.

SECTION IV

SURVEY OF BUSINESS AND INDUSTRY REPRESENTATIVES

Purpose of the Survey

The purpose of this evaluation was to assess how individuals from the business community view the (Indiana) state proposed Technology Preparation Curriculum. The evaluation focused on the perceptions of business and industry personnel related to the Technology Preparation Curriculum in three areas: (1) awareness of the curriculum, (2) importance of the curriculum features, and (3) relevance of the overall curriculum content.

Key Evaluation Questions

The following questions have been formulated to guide the evaluation and to meet the information needs of the Indiana State Board of Education and the five pilot site management teams:

1. How aware of the secondary Tech Prep curriculum are business and industry personnel?
2. How important do business and industry personnel feel the Tech Prep features and goals are?
3. How relevant do business and industry personnel feel the general and specialized curriculum content is in regards to their instructional program areas?

Sample

The sample for this survey was randomly selected from lists of businesses in the vicinity of each of the five pilot test sites. Types of businesses were chosen on the likelihood that they would employ Tech Prep graduates. These lists were provided by either the chamber of commerce or a similar database for each site. Out of the 375 instruments mailed, 72 were returned. See Figure 1 for a percentage breakdown of responses from each site. Representatives from eight major industrial/business areas comprised the base of this sample (see Table 1) with most of the respondents (48%) employed in the manufacturing industry. Although a majority of the respondents were classified as "owner, president or chairman" of the organization (57%), managers/supervisors (33%) were also well represented in the responding group.

Figure 1. Percentage Breakdown of the Sample by Site.

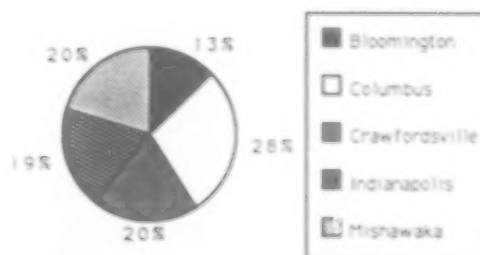


Table 1. Percentage Breakdown of the Sample by Industrial/Business Area.

Industrial/Business Area	Percentage
Agriculture	3%
Construction	8%
Finance, Insurance & Real Estate	2%
Manufacturing	48%
Retail Trade	4%
Service	17%
Transportation, Com. & Utilities	8%
Wholesale Trade	8%

Instrument

A survey instrument (see the appendix) was developed around the three key questions stated above. Each question was investigated through several corresponding items. The result was an eight item questionnaire titled the *Tech Prep Information Survey*. In addition, the instrument contained several paragraphs of background information. This information was included in order to give respondents who had not heard of Tech Prep the minimum knowledge necessary to complete the survey.

The first question, dealing with *awareness of the curriculum*, was investigated through two items. One item inquired as to whether the respondents had previously heard of Tech Prep and if so, how they had heard about it. The other item explored the awareness of respondents by asking them about their involvement with Tech Prep.

The second question, dealing with *importance of goals and features*, was investigated by an item consisting of a list of 10 goals and features of the Tech Prep curriculum. This item required respondents to rate the educational importance of each goal/feature on a 4 point scale that ranged from *Not Very Important* to *Very Important*.

The third question, dealing with *content relevance*, was investigated through several items. Two items were concerned with the core curriculum content, while one item dealt with the specialized curriculum content. The first item in this area consisted of a list of 12 core competencies that Tech Prep students should acquire as a result of completing the program. Respondents were asked to rate the relevance of each competency (in regards to their business/industry areas) on a 4 point scale that ranged from *Not Very Relevant* to *Very Relevant*. Another item was open-ended and gave respondents the opportunity to list any other core competencies which they deemed relevant to their business/industry areas. With regard to the specialized curriculum content, respondents were asked to rate the appropriateness of specialization in three distinct settings (high school, post high school, and the work place) on a 4 point scale ranging from *Not Very Appropriate* to *Very Appropriate*.

Finally, the survey concluded with an item requesting personal information (industry/business area, respondent title, and number of employees), and an open-ended item asking respondents to express any additional concerns or provide general comments.

Procedure

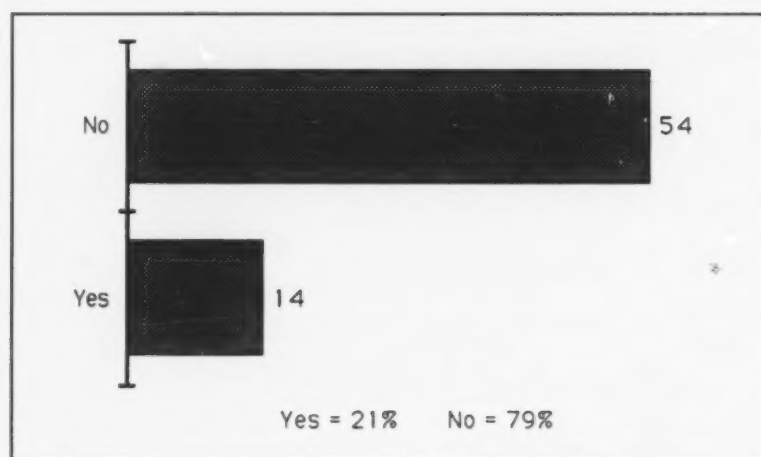
Business and industry personnel in the vicinity of the five pilot test sites were sent a mail survey instrument and a cover letter explaining the state mandate for Tech Prep. The instrument was distributed between May 23 and May 30 of 1991. Respondents completed the survey form and mailed them directly to Evaluation Consultants.

Results

All responses were coded and entered into Microstat, a microcomputer based statistical program. The entered data were summarized using descriptive statistics and frequency counts. The following figures and tables present a summary of responses to each item.

Figure 2. Responses to Item 1.

Have you heard about Tech Prep before receiving this survey form?



If yes, how did you hear about it?

Students	2
School Personnel	7
Local Media	5
Business/Civic Org.	8
Other	4

Representative and Dominant Responses to "Other":

- Company Involvement
- Direct Involvement: Part of Tech Prep Committee or Advisory Board
- Other employees

Figure 3. Responses to Item 2.

Have you or others in your institution been involved with Tech Prep?

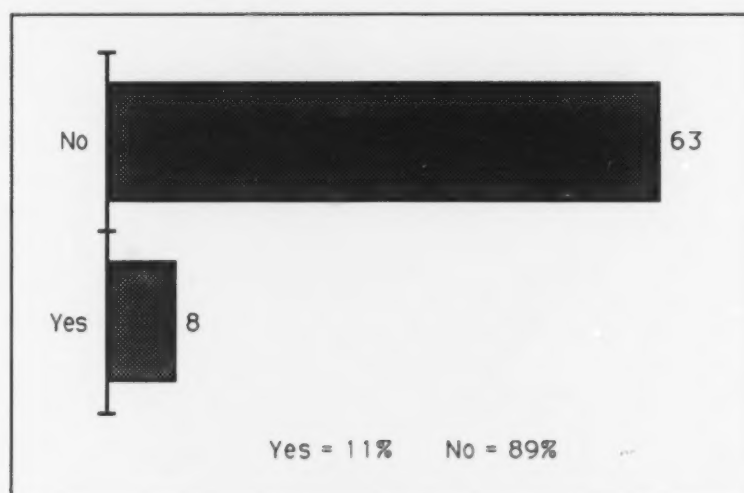


Table 2. Responses to Item 3.

Please rate the importance of the following Tech Prep purposes and features:

	Not Very Important 1	2	3	Very Important 4		
					Mean	Standard Deviation
a. Prepare students to live and work in a highly technical world					3.56	.65
b. Increase the number of high school graduates prepared for entry into technical occupations					3.42	.75
c. Increase the number of Indiana high school graduates who continue their education in a post secondary institution					3.48	.61

d. Integrate real life applications with academic subjects so students see meaning and relationships for what they are learning	3.76	.43
e. Provide a curriculum that encourages either a smooth transition from high school to employment or post secondary education programs	3.59	.52
f. Teach through work place applications	3.27	.65
g. Base student mastery on performance	3.38	.66
h. Involve local business, industry & labor in the planning, delivery and evaluation of the curriculum	3.46	.69
i. Emphasize skills such as problem solving, critical thinking, teamwork, and cooperation	3.80	.43
j. Serve those students now in a general, unfocused high school program of studies	3.16	.85

Table 3. Responses to Item 4.

Please rate the relevance of the following core competencies for your instructional program area:

	Not Very Important 1	2	3	Very Important 4		
					Mean	Standard Deviation
a. First year algebra competencies					2.93	.88
b. First year geometry competencies					2.78	.87
c. Probability & data analysis competencies					3.14	.74
d. First year biology competencies					2.00	.89
e. First year physical science competencies					2.67	.95
f. Competencies learned in four year comprehensive English					3.35	.73
g. Technical communication competencies					3.47	.60
h. Technical literature competencies					3.19	.70

i. Basic keyboarding competencies	3.19	.76
j. Basic computer application competencies	3.38	.68
k. Competencies in examining current and evolving technical careers	2.87	.72
l. Competencies in applying economic principles	3.19	.82

Table 4. Responses to Item 5.

Please list any other core competencies which you feel should be included in the secondary school component of the Tech Prep program based on the needs in your business/industry area.

Representative and Dominant Responses:

- Verbal communication
- Math
- Problem solving
- Basic and intermediate writing skills
- Humanities
- Presentation Skills
- Team Building
- Trigonometry

Table 5. Responses to Item 6.

Please rate the appropriateness of teaching specialized technical knowledge in the following settings:

	Important 1	Not Very 2	3	Very Important 4		
					Mean	Standard Deviation
a. High School					3.39	.75
b. Post High School					3.71	.53
c. Employer Conducted Training					3.32	.66

Table 9. Responses to Item 8.

Please use this space to express any additional comments or concerns regarding Tech Prep:

- "Great idea. I see high school and college graduates every day and they are not prepared for real life."
- "Upper grade students need hands on experience or visual contact with their chosen field as soon as possible."
- "Our school systems are almost incompetent at teaching the basics of math - too many school children reach 11th or 12th grade without the basics concepts of math ... many children won't even attempt Algebra because their basic math skills are so poor."
- "Too many young people are too eager to get into "shop" classes to get out of academic classes. Their future opportunities in higher learning are then limited. They need to realize that these tech classes are easily acquired in a post-high school setting. Basic English, math and personal finance skills are much more important."
- "This is a worthwhile process. I wish you and those involved the best, and I'm sure this will result in an improved curriculum for many students. I encourage educators to focus on techniques to make the learning process interesting and exciting."
- "The Tech Prep curriculum is a good start for preparing students for workforce readiness. Because of the costs, companies don't have the time or money to spend on this. We need students with good basic skills. They need to be able to work in a group environment and relate to people. Tech Prep helps the student be better prepared for today's environment."
- "The Tech Prep program is essential to upgrade the large 'middle segment' of students who need more technical skills but are not college bound or are intimidated by college bound type high school courses."
- "Tech Prep in high school is reading, writing, math, English, a second language, computer skills, theory, practice - then apply to specific real life experience. Business always welcomes free labor for training trade-off."
- "Not only should student mastery be based on performance, but teacher salaries should also be based on performance."
- "This and other efforts to match student competencies and performance to workforce needs is critical to our economic survival."

Summary Statements

- An overwhelming majority of the business and industry respondents are neither aware of nor involved with the Tech Prep curriculum.
- There is support for a majority of the Tech Prep goals/features. However business and industry representatives feel the most important aspects of the curriculum are *to prepare students to live and work in the present/future technical environment, to integrate academic knowledge with real life applications, and to teach students technical and interpersonal skills such as problem solving, critical thinking, teamwork, and cooperation*. Respondents indicated that the emphasis of education should be on teaching students how to deal effectively with the realities of their environment, both in the community and the work place.
- There is strong support, but less agreement, on the importance of the following Tech Prep goals/features: *Base student mastery on performance, teach through work place applications, and serve students in general, unfocused curriculum*.
- There are mixed reactions to the general relevance of the proposed competencies provided by the Tech Prep core curriculum content. *English, technical communication, and basic computer applications* are deemed to be the most significant competencies, however, competencies in physical science, biology, and geometry aren't viewed as very pertinent.
- There seems to be some support for the development of competencies in areas such as *verbal communication and presentation, math, basic and intermediate writing, problem solving, trigonometry, and team building*.
- Although post high school is rated as the most appropriate, Business and industry representatives, in general, feel that high schools, post high school institutions (IVY tech, 4 year university, etc.), and employer conducted training at work are all appropriate places for teaching specialized technical knowledge.
- In general, business and industry representatives view Tech Prep in a positive manner, and believe the program's strength lies in preparing students for work place readiness and in providing early exposure to career fields.

SECTION V

Conclusions

General Conclusions

1. Although each is unique in a number of facets, the pilot Tech Prep curriculum prototypes have a great deal in common. For the most part, the prototypes are in compliance with state guidelines, incorporate the features of the state model, and are working toward development of the levels depicted in the state model.
2. As the Tech Prep curriculum evolves at each of the sites, multiple entry points for students are increasing. Eventually, in each of the prototypes students will be allowed to begin studying Tech Prep during their first year of high school.
3. The first level of the state model (Tech Prep Core) is well established at each of the sites and progress is being made to establish and expand the second (Tech Prep Specialization) and third levels (Post secondary Articulation).
4. Although many economic principles are provided in a number of the Tech Prep courses, application of competencies in economic principles is not a well developed facet of Tech Prep as of yet. Only one site has developed a Tech Prep Economics course.
5. Computer applications is one of the cornerstones of the Tech Prep curriculum across sites. Competencies in keyboarding and computer applications are taught directly in several Tech Prep courses and are integrated throughout most courses.
6. Career information is an integral part of Tech Prep instruction at each of the sites. In most cases, an examination of current and evolving technical careers is incorporated into all Tech Prep courses.
7. Progress is being made to establish articulated programs of study between the secondary and post secondary levels at each of the sites. However, this is one of the areas in the overall state model for Tech Prep that requires much work yet. Progress varies across the sites ranging from a few articulation agreements firmly in place to beginning efforts at joint curriculum planning.
8. There is concern and confusion among Tech Prep students, teachers, and counselors about the extent to which Tech Prep courses are or will be recognized as academic courses by 4-year post secondary institutions.
9. Representatives from the business community have been extensively and actively involved at each of the pilot program sites in a wide range of activities ranging from helping to plan the Tech Prep curriculum to assisting with professional development activities.
10. Although Tech Prep course sequences are in place at all five sites, only three have developed individual plans of study for Tech Prep students.

11. Each pilot program is well managed. A great deal has been accomplished by this group of enthusiastic and competent individuals who have had only a part time assignment to Tech Prep.

12. All Tech Prep sites are staffed by committed and enthusiastic teachers.

13. Although each site has its particular strengths and differences, all have done a good job of planning, developing and implementing Tech Prep pilot activities.

14. Tech Prep has not been labeled a science, math or vocational program in any of the sites. Instead it is viewed as a form of school reform that involves the use of different strategies of teaching for and about technology. This is viewed as a positive result, and it should facilitate widespread implementation.

15. There is agreement among Tech Prep staff and the evaluators that Tech Prep, to be effective in meeting the needs of students in the general education curriculum, must be packaged and marketed as an innovative approach to teaching foundations for working and living in an increasingly technological world.

16. The current federal vocational education legislation includes considerable emphasis on "Tech Prep". This provides important symbolic and financial support for Indiana's Tech Prep efforts.

Key Question 1. Is the target population being served?

a. The Tech Prep efforts of the five pilot sites are effectively reaching the middle level, unfocussed, general education curriculum student. However, the broad range of students in this group, including at risk students, average ability students, and upper ability students, presents a challenge to Tech Prep personnel.

b. During year two sites expanded their offerings and have served more students of the target group.

c. In general, the gender make up of the Tech Prep student group follows traditional patterns associated with designated occupational components of sites.

Key Question 2. Is progress being made toward achieving the program goals?

a. Excellent progress is being made toward accomplishing program goals at each site.

b. Some goals are broad and long range and their accomplishment will be difficult to measure for some time.

Key Question 3. Is the curriculum performance based?

- a. Each site has its own unique format for curriculum materials and instructional planning. This variety has utility and appeal to the broad range of schools and teachers across the state. These materials should also provide a base for staff training.
- b. Curriculum, for the most part, has been developed in a performance based format at all sites. Expected competencies have been identified and emphasis is placed on students' abilities to perform tasks as well as on learning how and why.
- c. Curriculum development is a complex and evolutionary process. Excellent progress is being made toward implementing the performance based curricula.

Key Question 4. Are the science, math, and language arts courses being taught through practical application?

- a. Courses included in the Tech Prep curriculum have used a great deal of application oriented instruction. This is the most differentiating aspect of Tech Prep math, science and language arts courses from other math, science and language arts courses.
- b. The greatest amount of application oriented instruction occurs in science courses. It is usually easier to find applications in science than other areas.
- c. Tech Prep teachers are experiencing more difficulty in finding and using applications in math and language arts than in science. However, the proportional increase in the use of application instruction is greater in math and language arts than in science. Year two results reveal increased use in all areas.

Key Question 5. Are the student outcomes, in terms of competencies, the same as for similar courses taught in the traditional manner?

- a. There is a great deal of similarity across sites in the topics or content taught in math and language arts instruction. There is more variation in the science area.
- b. The content of Tech Prep courses is viewed as more complex and of a higher level than courses typically taken by the general education curriculum student. Additionally, teachers of Tech Prep strongly believe that the Tech Prep students are learning more from applications (i.e., problem solving skills, critical thinking skills, team work, willingness to try new things).

Key Question 6. How do local business, industry and labor groups perceive Tech Prep?

- a. Local business, industry and labor groups are reacting very favorably to Tech Prep. This is evidenced by comments and actions on the part of individuals.
- b. Employers believe that Tech Prep will provide a better informed and prepared workforce and will ensure exposure to new technology.
- c. Employers express the desire to be continuously involved in curriculum review and updating.
- d. Business and Industry respondents expressed support for a majority of the Tech Prep goals/features. Business and industry representatives feel the most important aspects of the curriculum are to prepare students to live and work in the present/future technical environment, to integrate academic knowledge with real life applications, and to teach students technical and interpersonal skills such as problem solving, critical thinking, teamwork, and cooperation.
- e. There are mixed reactions to the general relevance of the proposed competencies provided by the Tech Prep core curriculum content. *English, technical communication, and basic computer applications* are deemed to be the most significant competencies, however, competencies in physical science, biology, and geometry aren't viewed as very pertinent.
- f. In general, business and industry representatives view Tech Prep in a positive manner, and believe the program's strength lies in preparing students for work place readiness and in providing early exposure to career fields.

Key Question 7. How do post secondary personnel view Tech Prep?

- a. The names of courses (course titles) have been identified as a delicate and critical element of Tech Prep implementation. Titles are important in communicating the content of courses for recruiting, for accurately describing course goals to school personnel, and in facilitating acceptance of courses in admission and placement decisions of post secondary institutions.
- b. All sites included and involved post secondary personnel in the planning of Tech Prep activities. Extent of involvement beyond initial planning stages has varied across sites.
- c. For the most part, progress has been slow in formalizing articulation agreements with post secondary institutions.

- d. There is overwhelming agreement that the use of applications in teaching and the integration of subject matter across courses are desirable elements of Tech Prep.
- e. There is strong support but less agreement on the desirability of the use of precise performance standards, articulation of programs, and the focus on the general education student population.
- f. Post secondary personnel believe that the elements of Tech Prep should also be incorporated at their level of instruction. However, they recognize potential problems in implementation, e.g., money for new equipment and materials and revision of courses.
- g. Post secondary personnel identified: money for equipment and materials, qualified staff, and changes in organizational policy related to articulation as institutional needs for implementing Tech Prep at their institution.
- h. Post secondary educators in the regions of the five pilot sites are both aware of and involved with Tech Prep. State and federal emphasis on Tech Prep and the leadership of site managers have contributed to this awareness and involvement.
- i. Post secondary personnel appear to be supportive of the concept and features of Indiana Tech prep. They feel the most important aspects of the curriculum are *to prepare students to live and work in the present/future technical environment, to integrate academic knowledge with real life application, and to teach students technical and interpersonal skills such as problem solving, critical thinking, teamwork, and cooperation.*
- j. Post secondary educators have mixed reactions to the proposed competencies provided by the Tech Prep core curriculum content. *English, technical communication, and basic computer applications* are deemed to be the most relevant competencies. However, competencies in *biology, geometry, and data analysis* are not viewed as being as pertinent.
- k. Post secondary educators and business people alike, feel that the most appropriate place for teaching specialized technical knowledge is the post high school institution (IVY tech, 4 year university, etc.), and that high school is the least appropriate setting for technical specialization.

Key Question 8. What has been the Impact of Tech Prep on school climate?

- a. Tech Prep is a new program and it is difficult to note extensive effects on the climate and culture of schools. However, several initial influences have been noted.

(1) Some teachers, especially those who teach elective courses, have viewed Tech Prep as a threat to student enrollment. They think Tech Prep may draw students away from the courses they teach.

(2) Many Tech Prep teachers have altered the way(s) they teach in their other, non-Tech Prep courses to be more like Tech Prep.

(3) Increased interaction among teachers has been noted in all schools, with interdisciplinary cooperation and coordination occurring at most schools.

(4) Many teachers have indicated that Tech Prep has "revitalized" them and has provided a new mission.

Key Question 9. What changes have occurred in students' (1) attendance, (2) attitudes, (3) career maturity, and (4) grade point averages as a result of the program?

a. Tech Prep is providing an impetus to students for taking additional mathematics and science. Some students would not be taking the level of math and science offered through Tech Prep. Additionally, many students plan to take advanced math and science courses in the future, as a result of their Tech Prep experience.

b. Tech Prep teachers agree that students' attitudes toward school and learning have improved after being involved in Tech Prep.

c. Attitudes of Tech Prep students were generally more positive than those of control group students.

d. There were not great changes experienced in Grade Point Average and in absenteeism for the Tech prep Group.

Key Question 10. What features of the prototypes facilitate replication?

a. Each of the sites have successfully planned and developed a professional development process for Tech Prep teachers and have conducted or been involved in an extensive array of professional development activities.

b. Professional development is viewed by site managers as a focal point for implementation of Tech Prep across the state. However, there is much confusion and uncertainty as to how the inservice "cadre" will be used and how effective it will be.

c. Demonstration sites are critical to the implementation of Tech Prep across the state. Teachers and administrators from schools planning to initiate Tech Prep curricula need a place to visit and see firsthand in addition to listening to the "cadre".

d. Although political and situational uniqueness's of schools will determine effective replication, many aspects of the pilot programs can be replicated by other schools including: 1) curriculum materials and practical application examples, 2) staff development procedures, and 3) planning, implementation and management strategies.

e. The cadre and demonstration site concepts will facilitate replication of successful Tech Prep practices.

Key Question 11. What are the barriers to Implementing Tech Prep?

a. Lead time continues to be viewed as a major concern for effectively designing and implementing Tech Prep. Schools need time to recruit teachers and students and to schedule classes. Additionally, time for curriculum revision and adaptation are critical.

b. The current financial situation in the state and in each of the school corporations has caused some uncertainty among many Tech Prep teachers and other school personnel about the future of Tech Prep. This is making it very difficult to recruit students to maintain the Tech Prep curriculum within the schools, let alone expand it.

Key Question 12. What resources are necessary to implementing the prototypes in other settings?

a. Much of the success of Tech Prep can be attributed to the considerable effort extended at each of the sites to bring staff together for joint instructional planning and, in some cases, team teaching across instructional areas.

b. Staff development is a critical element for the effective implementation of Tech Prep. Specific needs have surfaced in the areas of curriculum development and/or adaptation and teaching strategies using applied methods, cooperative learning, learning styles, and subject matter integration.

c. Success of Tech Prep is heavily dependent on the faculty who have been selected and involved. The teachers' creativity, pedagogical skills, commitment, and willingness to work beyond the normal call of duty are critical elements.

d. School principals and other instructional leaders are aware of and involved with Tech Prep. Their leadership and involvement is crucial to widespread integration and long-term success.

e. Sites and site managers are required to spend a great deal of time with the hosting of visitors from other school corporations who are interested in Tech Prep. This responsibility is not appropriately reflected in project budgets.

SECTION VI

Suggestions

1. Establish and fund as many demonstration sites as possible where teachers and others can observe and discuss Tech Prep with those who have implemented it.
2. Provide direct and visible leadership at the State level. Possibly establish a State level coordinating committee for Tech Prep. This may facilitate funding from a variety of sources (including Perkins funds) and may result in synergy and efficiency.
3. Develop and communicate procedures and expectations for using the Tech Prep cadre.
4. Develop standard procedures and curriculum alternatives so that school corporations across the state will not be required to develop their own.
5. Work with four year institutions to reach agreement and understanding on the type and amount of credit that will be granted for Tech Prep courses in meeting admissions requirements.
6. Explore ways to retain 12th graders in Tech Prep who could graduate early.
7. Improve understanding of Tech Prep by communicating better with students, teachers, counselors, administrators and community people.
8. Package and market Tech Prep as a strategy of instruction rather than as a stand alone, equipment project.
9. Provide staff development opportunities for Tech Prep teachers regarding performance based curriculum development/adaptation and new teaching strategies.
10. On a state level basis, develop and package instructional applications that can be selected and implemented by Tech Prep teachers.
11. Encourage and facilitate the use of committees in the planning, designing and implementing of Tech Prep within school corporations.
12. Provide technical assistance to school personnel in selecting equipment and set-up of equipment and labs.
13. Establish policies for bringing together secondary and post secondary faculty and policies.

14. Initiate action to ensure that post secondary curricula is reformed to match the gains achieved in secondary Tech Prep.

15. Provide Tech Prep core courses at all schools but consider pooling resources to provide regional delivery of more expensive advanced occupational components.

Appendix

TECH PREP POST-GRADUATION TRACKING SYSTEM

The tracking system for Tech Prep Graduates is presented in a form that should be adapted to meet the specific needs of the Indiana Department of Education in future years. The specifics of the instrument will change as needs for information are refined.

Purpose of the System

The purpose of this tracking system is to determine the post program activities of Tech Prep and Control Group students. Through this determination it will be possible to make judgements regarding the effects that may be attributable to Tech Prep. Additionally, it will be possible to gain formative feedback that may be useful in refining the curriculum, articulation and other Tech Prep elements.

Procedures for the System

The following steps provide the process to be used to conduct the follow-up of graduates of the Tech Prep curriculum:

Establishing the System

Step 1. Determine who will be responsible for tracking students. It is suggested that the tracking be done centrally from the Indiana Department of education. This will ensure consistent and timely completion of the task. However, it will be necessary for the state level person to interact with a key contact within Tech Prep sites to gain current information (could be the Tech Prep manager, one or more Tech Prep teachers, and at least one counselor).

Step 2. Assemble a comprehensive list of students to be tracked. All Tech Prep graduates and students identified as the control group should be tracked.

Step 3. Explain the process to students and gain their permission and cooperation. This can be done in through a post card explaining the process and it's purpose. In the future, students can be informed prior to leaving high school

Step 4. Collect and record important base line information. Establish files for each student which include Tech Prep courses taken, academic record, standardized tests scores, etc. Have Tech Prep students complete the *Tech Prep Tracking Form*. Students in the control group should complete the form titled *Student Tracking Form*.

Step 5. Formulate additions to the follow-up form that reflect the information needs of the Department of Education. For example, two years following post secondary

education, the Department may wish to have information about the kinds of technology encountered by former students. The instrument should be augmented with items that will elicit this information.

Step 6. Setup a data base to store all the tracking information from each of the schools. This data base will be used to generate mailing labels and to store information that is gathered from former students at the determined intervals.

Tracking Students

Step 7. Establish a schedule for data collection over the next ten years. Data should be collected in years 1,2,4,6,8, and 10 following high school completion.

Step 8. Mail the follow-up instrument to students in the Spring of the years indicated above.

Step 9. Update information in the *Tech Prep Tracking Data Base* .

Step 10. Summarize data from the follow-up and prepare a report for the Department of Education.

Tech Prep Tracking Form

Student Name _____

Address: _____

Telephone: _____

Grandparent Name: _____

Grandparent Address: _____

Grandparent Telephone _____

Other person likely to know whereabouts: _____

Address: _____

Telephone: _____

Tech Prep Follow-up Form

We are very interested in your activities since you completed high school and other education in the State of Indiana. Please complete this form and help us improve education in the State.

Year 1:

Check employment status:

☐ unemployed

☐ employed full-time

☐ employed part-time

Indicate job position and title: _____

Indicate approximate hourly wage rate: _____

Check Education Status

☐ Not Currently enrolled in school

☐ Enrolled in IVY TECH full-time

☐ Enrolled in IVY TECH part-time

☐ Enrolled in 4 yr. Institution full-time

☐ Enrolled in 4 yr. Institution part-time

☐ Enrolled in other Institution (Identify)

What courses in high school helped you the most in your career.

What courses in post secondary education (if you had some) helped you most in your career.

What changes would you suggest for the educational programs you completed